An investigation in to demand for mobile library services at Shipley College

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Abstract

The purpose of this research was to investigate demand for mobile library services at Shipley College. Users of mobile technology have been shown to have particular information needs and expectations, and a number of objections were employed to explore these issues and to answer the research question. The first objective was to gain knowledge of mobile device ownership at Shipley College and the second objective was to explore how these devices were being used. The third objective was to consider potential barriers to implementing mobile library services. The fourth objective sought to gauge student's opinions of using their devices for library services, and subsequently, the fifth objective was to ascertain which would be the most viable services to implement.

A quantitative research approach was identified as the most appropriate as it was considered necessary to obtain a large number of responses in order to predict likely take-up of services. It also enabled trends in mobile device ownership and use to be charted. The study employed a purposive sampling method in order to ensure that those being sampled were relevant to the research question. Questionnaires were distributed both online and in print, and contained a mixture of closed and open-ended questions.

Respondents were found to be technologically well-equipped and, on the whole, were receptive to mobile library services. In particular, users showed a preference for instant messaging and services delivered via social networking sites. The need for the creation of mobile-friendly web content was also affirmed, but responses to SMS services were more mixed. Barriers to implementing mobile services were demonstrated, and the need to avoid these through effective marketing and user education was emphasised. A number of recommendations are made for implementing mobile services at Shipley College based on the findings.

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List of abbreviations

APA	American Psychological Association
FE	Further education
HE	Higher education
IT	Information technology
LISA	Library and Information Science Abstracts
LISTA	Library, Information Science and Technology Abstracts
LRC	Learning Resource Centre
NFC	Near Field Communication
PC	Personal computer
QR	Quick responses
RFID	Radio Frequency Identification
SMS	Short message service
UK	United Kingdom

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Chapter 1: Introduction

1.1 Background to the research

Technology has become pervasive in almost every aspect of UK society. Ownership of internet-enabled mobile devices is steadily on the rise, and they are being used to carry out a multitude of tasks on a daily basis, from shopping to gaming. According to Ofcom (2013), smartphone ownership doubled from 2012 to 2013 and take-up of tablets has more than doubled in the same period. Mobile technology is having a huge impact on how young people communicate and on how they search for information. Ofcom found that web-based communication is the most popular type of communication amongst 16 – 24 years olds (2013, p. 6). In light of this, libraries need to ensure that the services they offer cater to mobile devices due to their growing importance in carrying out everyday tasks. Booth states that the "lightening rise of mobile technology means that users' expectations of mobile-optimized content and applications have become a foregone conclusion" (2013, p. Xix). Crucially, it means that unless libraries evolve to become mobile-friendly, they risk falling behind and becoming less relevant to their customers.

1.2 Research problem

As discussed, the proliferation of mobile technology is changing how people interact with information. Subsequently, this impacts on users' expectations of their library service. The onus is on academic libraries to ensure that they are responding to users' needs by supporting them in using their mobile devices at college and university. Carroll (2014) states that

students are bringing more devices than ever to college and that the infrastructure needs to be there to support their use. This involves providing access to a wireless network as well as ensuring that adequate support is available from IT and library services.

Not only is technology evolving, but users' information seeking behaviour is changing too. They are more likely to be multi-tasking, carrying out quick context-specific searches and viewing media on a small screen (Walsh, 2012; Heimonen, 2009). Mobile library services need to be designed with this behaviour in mind. There are an array of mobile-friendly services that libraries can introduce, ranging from offering an enquiry service via instant messaging to promoting e-books using quick response (QR) codes. However, with limited staff time and budgets, it is imperative that any new services are targeted effectively and are created as a result of user feedback. Designing mobile apps and mobile websites can be costly, so it is important to ask users about their preferred features. The research question for this project arose from a need to create more responsive mobile library services at a Further Education (FE) college library. In order to do this, it was deemed important to understand what type of mobile devices students currently owned, to gain knowledge of how they were using them and to query whether they would be interested in using their mobile devices for library services. Decisions to implement particular services would be based on the outcome of this feedback.

1.3 Research aims and objectives

1.3.1 Research aim

The aim of the research is to investigate whether there is demand for mobile library services at Shipley College. Following on from this, the second aim is to ascertain what type of mobile library services should be considered.

1.3.2 Research objectives

The objectives of this research are:

- To gain knowledge of the range of mobile devices owned by students at Shipley College.
- To gain insight in to how students at Shipley College are currently using their mobile devices.
- To investigate any barriers to implementing mobile library services, such as cost and lack of awareness of library services.
- To gauge students' opinions of using their mobile devices for library services in order to predict likely take-up and demand for such services
- To determine which potential mobile library services should be considered for implementation, in line with student feedback.

1.4 Scope of the research

The study was conducted with the student population of Shipley College. Both full-time and part-time students were included in the research as well as adult learners and those in the 16 – 19 age group. For the purposes of this study, the term 'mobile device' is defined as a portable electronic device, typically with internet access. The research focused on a specific set of mobile devices: smartphones, non web-enabled phones, laptops, netbooks, MP3 players, e-book readers and tablet computers. Due to the use of a non-random sampling method, the results of the study cannot be generalised to the wider population. However, the findings will

be used to inform policy decisions on the introduction of mobile library services at Shipley College Learning Resource Centre (LRC).

1.5 Structure of the dissertation

Chapter one introduces the subject of the research. The study's aims, objectives and research scope are outlined, and contextual background information regarding the research topic is provided.

Chapter two reviews the literature on mobile library services. This includes a consideration of the rise of mobile technology and the impact it has had on user's information behaviour. The need for libraries to respond to current trends in technology use is outlined and an overview of potential mobile library services is provided.

Chapter three provides an account of the methodological approach adopted in order to address the research questions. The data collection and analysis methods are outlined, as well as the sampling technique and the limitations of the study.

Chapter four presents the findings obtained through the primary data collection. The data is presented using a mixture of text, tables and graphs.

Chapter five discusses the results of the primary research in relation to existing research and literature.

Chapter six reviews the findings in relation to the study's aims and objectives. The outcomes of the research are reflected upon and recommendations are made for the future.

1.6 Referencing and citation style

This dissertation follows guidelines as set out in the sixth edition of the APA (American Psychological Association) method of referencing.

Chapter 2: Literature review

2.1 Introduction

The prevalence of mobile technology is creating a nation of multi-taskers. Increasingly, mobile devices are being used to browse the internet, send emails, view media and connect to social networks. This literature review begins with an overview of the mobile era, and the effect that mobile devices are having on information exchange. The implications for libraries are considered, especially the role that mobile technology is playing in changing users' expectations of their library service. In order to stay relevant, libraries need to be up-to date with the latest technology and offer services which cater for mobile devices. An outline of mobile library services is provided, with a discussion of the advantages and disadvantages of each service. Examples are provided of mobile services at various educational establishments, and the importance of being guided by user feedback when designing services is emphasised. Finally, issues around implementing mobile services, such as cost and marketing, are considered briefly.

2.2 A mobile age

In 2010, Lippincott predicted "A mobile future for academic libraries" (Lippincott, 2010). She viewed society as being on the cusp of a mobile revolution, whereby the capabilities of smartphones would enable students to access information in new and innovative ways. A couple of recent studies have validated Lippincott's prediction. Research at Hunter College in New York investigated how many of the students owned internet enabled devices and how they were being used (Becker, Bonadie-Joseph and Cain, 2013). The authors discovered that

students were increasingly using their mobile devices for educational purposes and relied on mobile devices for internet access even when desktop PCs and laptops were available (2013, p. 693). Researchers at Sheffield University found that students were much more likely to use smartphones in lectures than any other piece of equipment ("Student mobile device survey 2011", 2011, p. 9).

Ofcom has reported that there are 82.7 million mobile subscriptions in the UK, and that smartphone owners now account for 56% of mobile users (Ofcom, 2013). Furthermore, Ofcom reports that the average household now owns at least three internet-enabled mobile devices. Ofcom's research highlights a growing and important trend: that increasingly people are becoming media multi-taskers. The purpose of this research project is to explore whether there is a demand for mobile library services at Shipley College. It will therefore probe how students are currently using their devices and whether media multi-tasking transfers to an academic setting.

2.3 Mobile information needs

Information seeking now often happens on the move and "people expect to be able to work, learn, and study whenever and wherever they want to" (Johnson et al., 2012). As a result, libraries need to rethink how they deliver their services. Walsh states that traditional information literacy models are not adequate at explaining a mobile clientele's information seeking behaviour (2012, p. 24). Users are likely to be carrying out quick, context-specific searches and are not tied to a fixed location (Walsh, 2012, p. 24). Furthermore, as well as searching for information whilst on the move, users are likely to be multi-tasking (Paterson and Low, 2011). Bomhold conducted research in to the educational use of smartphones by undergraduate students, and, like Walsh, discovered that 'digital natives' expectations when

finding information is that it should be fast, accessible and available anytime (2013, p. 430). Consequently, libraries should be designing services with these needs in mind. SMS reference and instant messaging may appeal to those who are seeking information on the move, and mobile websites and apps will benefit those viewing content on a small screen.

2.4 Opportunities for libraries

As outlined above, the sharp rise in ownership of mobile devices has had a massive effect on users' information seeking behaviour, and this will impact on their expectations of their library service. Several researchers have warned that this trend is too important for libraries to ignore (Johnson, Adams and Cummins, 2012; Lippincott, 2010; Little, 2011; L. Thomas, 2012). However, student's increasing reliance on their phones to satisfy their information needs can also present opportunities for libraries. Amongst the benefits discussed by Traxler (2011) of using mobile devices in learning environments, is that they can be leveraged for situated learning, i.e. learning which takes place in contexts that make it meaningful. At the University of Huddersfield, QR codes are used around the library to link resources and information relevant to their location (Walsh, 2010a). L. Thomas (2012) argues that mobile technology allows students to be self-sufficient and provides quick access to librarians. Well designed mobile services reduce the need for patrons to visit the physical reference desk, and can drive the demand for "patron self-service features and responsive communication" (2012, p. 27). Reference services, delivered via instant messaging platforms, provide synchronous communication to library patrons wherever their location. Similarly, mobile technology can be utilised by library staff to provide an enquiry service on the move, such as the roving reference support offered at the University of Leeds (Kilroy, 2013).

2.4.1 Harnessing social media

In a mobile age, more traditional means of communication may no longer be enough for some users. Social media presents libraries with an opportunity to engage with their users in new ways. One of the benefits of using social media is that they are already compatible with mobile devices. Social networking sites, such as Facebook, Youtube and Twitter, are available both as a mobile site and as a downloadable app. A number of academic libraries are using social media effectively to communicate with their users. The Open University Library raised its profile through its 'shelfies' campaign, whereby entrants submitted photos of their bookshelves via Facebook to be entered in a prize draw ("Shelfies competition terms and conditions", 2014). Users of Cambridge University Library can perform a number of library functions directly on their Facebook page, including searching the library catalogue and renewing books ("Facebook applicatons, n.d.). Strategies such as these enable academic libraries to harness social media and mobile technology to connect with users and promote their services. There are a range of other mobile services for libraries to consider, which will be examined in the following section.

2.5 Mobile library services

As well as investigating demand for mobile library services at Shipley College, one of the central research aims of this project is to explore what type of mobile services should be considered. This section will examine the types of services available, and will consider issues such as implementation and the pros and cons of each service. Table 2.1 summarises these main points.

	What is it?	Pros	Cons	Implementation
SMS reference	Delivery of an enquiry service via SMS	Suitable for responding to quick information requests; can be sent and received with a basic phone	Popularity of SMS may be falling	Using a standard mobile phone or a web-based SMS portal
Chat reference	A synchronous reference service using instant messaging	Provides instant support to customers whatever their location; allows a more informal means of communication between libraries and their users	Increased workload for staff members to run a virtual reference service alongside a physical reference service; replies expected immediately	Numerous software options available, including free instant messaging platforms such as Google Chat
QR codes	A two-dimensional barcode that can be read using a smartphone camera	Links the physical with the virtual world; saves time – no need to type out URLs	Onus is on user to download a QR code reader; lack of awareness of what QR codes are	Can be created for free using a QR code generator
Mobile websites	A website optimised for viewing on mobile devices	Enables a better viewing experience of websites accessed on a small screen	Contains more limited information than a standard website; usually less stylish than a mobile app	Expertise needed, although a basic mobile website can be cheap and relatively easy to create using a mobile style sheet
Mobile apps	A software application designed to run on mobile devices	Tend to have more functionality than mobile websites, and look more attractive	Use is limited to particular devices; users have to choose to download them	Can be expensive to create due to level of expertise needed; may have to be outsourced

Table 2.1: Types of mobile library services

2.5.1 Text messages (SMS)

A potential service would be to offer reference facilities via text message (SMS). Walsh (2012) maintains that it is an easy service to get running with relatively low start-up costs.

Mobile phone ownership is very high in the UK, and it is a well-established means of communication. However, Walsh warns that due to the personal nature of mobile phones, it can be viewed as intrusive if too many messages are sent (2012, p. 41). Previously, the need to offer quick context-specific information was discussed, and SMS is appropriate for this purpose. A study at San Jose State University found that "text reference is a suitable means for brief and straightforward information needs" (Luo, 2013 p.132). Feedback from a study at the University of Huddersfield indicated that SMS sent by library staff were a useful supplement to inductions when students are likely to be feeling overwhelmed with information (Walsh, 2010b). L. Thomas (2012), Parsons (2013) and Ruppel and Vecchione (2012) all cite the anonymity offered by SMS as a further benefit of SMS reference as it allows users to report issues that they may not be comfortable approaching the reference desk about. However, research by Ofcom suggests that the number of SMS being sent is in decline (Ofcom, 2013, p.342). Ofcom suggests that this is due to smartphones offering alternative means of communication, such as email, instant messaging and social media. Therefore, although SMS reference may be a relatively straightforward service to implement, it's relevance to users may decrease in the near future.

2.5.2 Instant messaging

Instant messaging, or chat reference, enables synchronous communication between libraries and their patrons over the internet. There are various software solutions available for implementing instant messaging as a service (Bielskas & Dreyer, 2012, p. 61), many of which are free. Shipley College currently uses a range of Google products, including Gmail, Google Drive and Google Chat. Chat is used for communication between staff members only, but there is the possibility for the LRC to use it to communicate with students. It is free to use, so the main cost would come from the use of staff time and resources. Instant messaging

is used successfully at a number of higher education institutions in the UK (Barnes, 2011; Curtis-Brown, 2011; Okolo, Mitchell, & Fennel, 2011; Haerkoenen, Blackmore and Beadle, 2012). Chat reference enables a more informal means of contact between library staff and patrons (Chan, Ly, & Meulemans, 2012). Amongst the advantages discovered by Barnes, following a study at the University of Sussex, is that chat reference allows a more personal approach to dealing with enquiries than email; it provides support for students with remote access; it is possibly a better outlet for students with language difficulties; and it's conversational nature allows queries to be explored more fully (2011, p. 21). Social networking sites, such as Facebook and Twitter, can also be used for instant messaging (Petit, 2011; Chu & Du, 2013). Petit claims there are a number of advantages to using Facebook and Twitter for communicating with library patrons, including cost-effectiveness, accessibility, ease of use and the popularity of the sites amongst library users (2013, p. 254). However, the fact that instant messaging is a synchronous communication tool can also be a drawback. With email, a short delay in replying is acceptable, but with chat reference a reply would be expected immediately, and this may be a problem if there are limited staff resources. Furthermore, whilst the anonymity of SMS and instant messaging can be beneficial in allowing students to report issues, Hendricks and Buchanan (2013) state that it can also leave staff open to abuse and that protocols should be in place for dealing with this.

2.5.3 QR codes

QR codes are two dimensional matrix barcodes that can be scanned with a camera phone and link to external content, such as a website, email or a phone number (Walsh, 2012, p. 66). QR codes do not require much technical expertise to create and can be generated online for free (Lamb & Johnson, 2013). They have numerous library uses, from supplementing inductions (Ewel, 2014) to marketing library resources (Lamb & Johnson, 2013). QR codes create a link

to the virtual world. They can connect print and electronic journals (Walsh, 2011) and create a tie between physical and virtual book collections (Ford, 2013). Semenza, Coury and Gray (2012) described a project where dummy books were created and labelled with QR codes, which then linked to the e-book collection. The authors reported a significant increase in use of the e-books compared to the same period in the previous year (Semenza et al., 2012, p. 49). A similar project was undertaken at the University of Exeter's Forum Library. However, feedback from the students indicated that mobile phone screens were too small for reading an e-book, although it was suggested that it would be considered in the future with a larger screen mobile device (Green, 2013, p. 37). However, smartphones are improving all the time, and the Samsung Galaxy Mega, for example, has a 6.3 inch screen, blurring the lines between smartphones and tablet computers (BBC News, 2013).

Elmore and Stephens state that there are there are two major barriers to the use of QR codes: client disinterest and lack of knowledge of how the codes functioned (2012, p. 37). Walsh conducted research on QR codes at the University of Huddersfield in 2009, and the student's feedback suggested that the codes were complicated to use and not commonplace enough (2012, p. 15). However, a subsequent study by Ramsden indicated that "...student engagement with QR codes is increasing over time" (2010, p. 4). QR codes have the potential to be useful, provided that awareness of them exists through successful marketing and if they are used appropriately. Elmore (2012) suggests that QR codes may be a bridging technology, likely to be replaced by something else in the near future, but their adoption at least indicates that libraries are looking for innovative ways to engage with their users.

2.5.4 Mobile websites

Increasingly, mobile technology is being used to browse the internet, and Power states that in the near future, mobile devices will surpass desktop PCs as the most common means of accessing the internet (2012, p. 1). Ofcom discovered that "Younger users are more likely to use a mobile phone than a computer for almost all the digital communication methods asked about" (Ofcom, 2013, p.7). According to the Open University, mobile websites benefit the growing number of people whose only access to the internet is via their mobiles, and therefore increases an organisation's chances of retaining a more mobile-orientated clientele (The Open University, n.d.). A number of universities have created websites and apps which are optimised for mobile viewing. The University of Glasgow Library's mobile site allows users to search for articles and exam papers, access their library account and check PC availability (University of Glasgow Library, n.d.). The University of Bristol Library provides mobile access to its catalogue and to electronic resources, although compatibility is dependent on the type of device and on third party software application (University of Bristol Library, 2014). The Open University has created mobile Safari, a series of revision modules designed to be accessed on a mobile device (Open University Library Services, 2014).

Not only is it important for libraries to design mobile-friendly content for its users, but they must also ensure that the resources they subscribe to are optimised for viewing on mobile devices. Shipley College LRC provides access to e-books on two platforms: Dawsonera and Ebrary. Both suppliers have mobile apps which are compatible with Android and Apple devices (Dawson Era, n.d.; Ebrary, n.d.). However, two of the LRC's most popular online resources, Complete Issues and Issues Online, are not currently optimised for mobile access, although Issues Online is planning to make improvements to its website which will make it better suited to mobile viewing (see Appendix E). One of the aims of this research project is

to gain insight in to how students at Shipley College are using their mobile devices, and investigate how the LRC can respond to this. As well as creating mobile accessible resources in-house, it will be important to consider the mobile-friendliness of external resources when making purchasing decisions.

2.5.5 Mobile apps

An alternative means of offering mobile optimised content is the creation of a mobile app. Like mobile websites, the features of an app should be determined by user feedback. The University of Stirling's Information Services department discovered, following a student satisfaction survey, that email was one of the most requested features of a university app (Wilson, 2013, p. 189). Unlike mobile websites, which are designed to work across different devices, apps are created for a specific platform. Therefore, Huwe (2013) argues, they target the individual and create a more personalised experience. As they are designed for one platform only, the focus can be on making the content as slick as possible (Walsh, 2013, p. 55). However, the fact that they are designed for particular devices is also a drawback, as it excludes everyone who doesn't own that specific device. Also, they require more expertise than mobile websites to create, so, consequently, have the potential to be more expensive. The onus is on users to download them, and it may be difficult to get their target audience to continue using them after the initial marketing flurry (Wilson, 2013, p. 196). Mobile websites may, therefore, be a more viable alternative than an app, as they are likely to be "...cheaper, easier to run and accessible to more people" (Walsh, 2013, p.58).

2.5.6 New technologies

The pace of technological change moves very quickly, and the technologies mentioned above may decline in the future as alternatives become available. The fact that SMS may be falling in popularity has already been discussed, and several authors have suggested that QR codes

may be a bridging technology (Elmore & Stephens, 2012; Ford, 2013; Lamb and Johnson). Potential successors to QR codes are Radio Frequency Identification (RFID) and Near Field Communication chips (NFC). RFID allows data to be transmitted and received across short distances wirelessly. NFC has evolved from RFID, but is designed to be scanned at a closer range. Like QR codes, RFID and NFC can link physical materials with digital information (McHugh & Yarmey, 2014). RFID and NFC can be used in a number of ways, including access control, electronic payment and information exchange (Hoy, 2013). Walsh (2012) believes that the technology holds several possibilities for libraries. Currently, RFID is mainly used for functions such as self-issue of books. However, if RFID and NFC readers in phones become more commonplace, it opens up the potential for libraries to use RFID in new ways. They could be used in books to link to extra content, in the same way that QR codes are used currently (Walsh, 2012, p.80). The use of these technologies is still quite limited in libraries, but Guevara believes their popularity will continue to grow and that it is important for libraries to keep abreast of the future role they may play in information exchange (Guevara, 2012).

2.6 Considerations and issues

2.6.1 Library policies

Libraries will need to review their policies on mobile phone use if customers are to avail of mobile services. Clay (2011) argues that library rules which completely restrict the use of phones on the premises are short-sighted. Clay asserts that it is better to address specific disruptive behaviour than to have a blanket ban on the technology, which affects all users. Shipley College Learning Resource Centre (LRC) currently has a ban on mobile phone use

on the premises, and it is becoming increasingly difficult to enforce due to the pervasiveness of the technology. The aim of this research project is to investigate the demand amongst students for mobile library services, but this aim will be futile unless the LRC first introduces more mobile friendly policies. A balance needs to be found between enforcing rules and allowing students to utilise mobile technology, and Stephens (2013) advocates using positive, rather than prohibitive terminology, such as "Quiet conversations, please" (2013, p. 1).

2.6.2 Cost of services

One of the objectives of this research is to gauge students' opinions of mobile library services prior to implementation. Introducing mobile library services can be costly and resource intensive, and according to Mills (2009), it is vital that such services are targeted to meet actual needs. Unlike QR codes and instant messaging, which can be implemented for free, creating a sophisticated mobile website is a more expensive exercise. Shipley College LRC does not have the knowledge to develop a website in-house, so would have to pay to have it created externally. Parsons (2013) suggests that if there is an insufficient budget to create a mobile website, then using social media can fill the gap as social media websites such as Facebook and Twitter are already optimised for mobile viewing (2013, p. 69). There is also a potential cost to students of using the internet on their mobile devices. Lippincott (2010) reported reluctance by students to use the mobile web on their phones due to cost. However, Paterson and Low (2011), in a study in an academic library, found that the majority of students had either an unlimited internet allowance or sufficient access for their needs. This study will query whether cost is a limiting factor in the use of mobile internet at Shipley College. Awareness of the College's free Wi-Fi will also be investigated, as the importance of a WiFi connection to students has been demonstrated at the University of Kent, where it

was found to be the most popular configured service on student owned devices ("Information Services mobile device survey 2012", 2012).

2.6.3 Marketing and review

The decision to implement mobile library services should be driven by patron feedback, but the success of any service will also be determined by the level of customer awareness (Luo, 2012). As highlighted above in relation to QR codes, a library customer is unlikely to use a service if they are unsure what its purpose is. Therefore, the introduction of any new service needs to be accompanied by an effective marketing campaign. Chan (2012) found that using Facebook was a cost-effective means of advertising a university library's new mobile website. Manchester Library was able to reach a new audience by using social networks such as Twitter, Facebook and Flickr (Lawson, 2014). In addition to marketing any new services, it will be vital to promote and raise awareness of existing mobile services as well, such as the mobile apps offered by Ebrary and Dawsonera. Furthermore, due to the rapid speed of technological development, services will need to be continuously reviewed to ensure that they are still relevant to library patrons (Walsh, 2012).

2.7 Summary

The literature discussed indicates that there is a need for libraries to design mobile services. In terms of which services to introduce, there are advantages and disadvantages to each service, and implementation should be driven by the needs of library users. Obtaining feedback from students at Shipley College, and also understanding how they currently use their mobile devices, will be vital to this process. There is no doubt as to the impact that mobile devices are having on users' information seeking behaviour, but users' expectations

of their library service will vary from institution to institution. Much of the published literature considers the impact of mobile technology in higher education, but there is a gap in the literature when considering the needs of students in a further education setting, which this research will seek to address. It is hoped that the outcome of this will be to align future services with library customers' needs, and that both staff and monetary resources can be used effectively in achieving this goal. The next chapter describes the methodological approach adopted to investigate the research questions.

Chapter 3: Methodology

3.1 Introduction

This chapter outlines the methodological approach employed by the researcher in order to address the research questions. The purpose of the study is to investigate whether there is a demand for mobile library services amongst students at Shipley College. A wide survey of students was required, and a predominantly quantitative approach was identified as the most suitable for this purpose. A questionnaire was used as the survey instrument, and issues relating to its design and piloting are detailed in this chapter. The target population and sampling method are also described. Finally, ethical considerations are outlined, and the limitations of the study are highlighted.

3.2 Research strategies

Social research methods can be divided broadly in to two strands: quantitative and qualitative research. These approaches are characterised by differing ontological, epistemological and methodological considerations.

3.2.1 Quantitative research

Quantitative research is a systematic approach that emphasises the quantification of data. It is most closely aligned with the positivist paradigm, and the social world is viewed as an external reality that can be studied objectively. The relationship between theory and research tends to be deductive, and the research often begins with a hypothesis (Walliman, 2006) One of the main criticisms of quantitative research is that the social world cannot be studied in the

same way as the natural world, as the two are inherently different. (Bryman, 2008, p. 159). However, quantitative research is a useful strategy in situations where a wide range of responses are required from a large number of subjects, and where the results will be generalised to the wider population. Quantitative research methods include questionnaires, structured interviews, structured observations and transactions logs. Questionnaires were identified as the most appropriate research method for this study, and are discussed in more detail in section 3.3.2.

3.2.2 Qualitative research

In contrast to the quantitative approach, the qualitative strategy views society as being made up of multiple subjective realities. Typically using a small dataset, researchers focus on the language and interpretation of meaning by the research subjects. Its epistemological position is aligned with an interpretivist stance, and a natural science model is viewed as being inappropriate for studying the social world. Theory tends to emerge from the research, rather than from a pre-defined hypothesis. A criticism of qualitative research is that the data analysis is subjective (Pickard, 2007). Furthermore, according to Bryman, there can also be issues around the concepts of reliability and validity. It is difficult to replicate a qualitative study and to generalise the results to the wider population (Bryman, 2008, p. 276). However, the qualitative strategy is useful in situations where the research is concerned with understanding meanings and experiences from individual participants' points of view. It also enables researchers to explore answers in more depth, which a more structured quantitative strategy might not allow. Qualitative research methods include focus groups, participant observations and interviews. Interviews were considered as an alternative research method for this study. Interviews are discussed in section 3.5.

3.3 Data collection methods

3.3.1 Secondary data collection

3.3.1.1 Literature review

Prior to carrying out the primary research, a secondary search of the literature was conducted to provide context for the study and to explore the issues surrounding the research questions. A number of Aberystwyth University's resources were used including Primo, Library and Information Science Abstracts (LISA) and Library and Information Science and Technology Abstracts (LISTA). Nexus UK and Google News were searched for relevant news articles. Ofcom's website was consulted for up-to-date statistics and reports on mobile technology use. Initially broad search terms such as 'mobile library services' were used. This term was slightly problematic as it can also be used to refer to delivering library services with a mobile van. However, it was mostly used in this context for older literature. Due to the nature of the study, the researcher was interested in more recent literature, so using the search term under these parameters yielded more relevant results. The literature search was then refined by combining terms such as 'smartphones' or 'mobile technology' with terms such as 'academic libraries', applying Boolean logic where possible. Further literature searching was carried out by using the preferred keywords in databases, such as 'mobile communications' in LISA. Other relevant literature was located by looking through the references of relevant sources and by using the citation tool in Google Scholar. The literature search enabled the research question to be contextualised and refined, and also helped to formulate questions for the questionnaire.

3.3.2 Primary data collection

3.3.2.1 Questionnaires

Both online and print questionnaires were distributed to students at Shipley College. The online questionnaire was generated using Survey Monkey, and the link to the questionnaire was emailed to the participants' college email account. Not all students check their college email account, so it was felt that a greater proportion of the student population could be reached by also using print questionnaires. The print questionnaire was distributed in the LRC and in the main reception foyer. The questionnaire was handed out at different times of the day throughout the week in an attempt to diversify the sample and reach both full-time and part-time students. A broad survey of students' opinions of potential mobile library services was required, and questionnaires were deemed a suitable research tool for this purpose. G. Thomas states that questionnaires are a versatile tool that can be used in a variety of research designs (2013, p.207). Self-administered questionnaires are usually cheap to produce and are quicker to administer than interviews. A further advantage of questionnaires over interviews is that respondents have time to consider their answers while completing them. Moreover, questionnaires can provide anonymity for respondents and also overcome the problem of social desirability bias, which can occur when an interviewer is present (Bryman, 2008, p. 218). Bryman proposes steps to improve response rates, such as writing a good explanatory covering letter and sending reminders. These measures were followed by the researcher, and email reminders, in particular, were useful for generating more responses. Furthermore, the researcher was present when the print questionnaires were administered, and this helped to ensure a good response rate.

3.3.2.2 Questionnaire design

The questionnaire can be seen in Appendix D. It contained 20 questions in total, mostly in a closed format. Bell (2010) recommends that questionnaires start with "straightforward, easy-to-complete questions and move on to the more complex topics" (2010, p. 149). According to Bryman, closed questions are straightforward to process and code, and they enhance the comparability of answers (2008, p. 235).

Different question formats were used depending on the type of data being collected. Multiple-choice question were used to gain an overview of which devices the respondents owned or were planning to own in the near future. G. Thomas states that this format is particularly useful when the aim is to gather facts (2013, p. 210). Frequency scales were used to determine the level that various devices were used for different tasks. As per Bryman's recommendation (2008, p. 240), specific frequency terms were used. Bryman advises against using ambiguous terms, such as 'often' and 'quite often', as these terms can be interpreted differently by the respondents. Rating scales were used to explore how receptive the respondents would be to using their devices for mobile library services.

As previously mentioned, the questionnaire contained predominantly closed questions. Bell maintains that although open questions can generate useful data, analysis can be problematic (2010, p. 141). However, one of the issues with using a completely closed question structure is that the respondents are unable to answer questions flexibly and in their own terms. Open-ended questions were included to collect more qualitative data and to give participants scope to elaborate on their responses. Open questions were useful for exploring how the participants' felt about certain aspects of using mobile technology, such as the most important tasks that their devices allowed them to do. The questionnaire also ended with an open question asking for further suggestions as to how the LRC could develop mobile library

services. The aim of this was to allow the respondents to expand on any points which weren't covered in the rest of the questionnaire.

3.3.2.3 Piloting

Piloting questionnaires is recommended to highlight issues, such as question ambiguity and to test the effectiveness of the wording and layout (Bell, 2010; Brett Davies, 2007; Bryman, 2008). Bell states that, ideally, the questionnaire should be piloted on a sample similar to the one that will be involved in the study (2010, p. 151). The questionnaire was piloted on six students and four members of staff. Feedback was obtained using criteria outlined by Bell (2010, p.151). The participants were asked how long it took to complete the questionnaire, whether the layout and instructions were clear,and some further questions regarding wording and clarity. As a result of the pilot, a third option was provided for question 2. One of the respondents didn't have mobile web access, and the other two options didn't provide for this. Some minor amendments were made in other areas to make the question wording clearer and unambiguous.

3.4 Methods of data analysis

Once all of the online and print questionnaires were collected, they were checked for errors and any incomplete questionnaires were discarded. Microsoft Excel was used to organise the data and to generate statistics. The closed questions had been assigned codes prior to distributing the questionnaires, and this data was entered in to the spreadsheets. The data was converted in to charts, including pie charts and column charts, for visual comparison of results. The open questions were analysed and coded using content analysis. Open questions can produce a variety of responses, and according to Gillham, "the job of content analysis is

to reduce them to manageable and meaningful categories" (2000, p. 63). The answers to each open question were collated together in a word document. The categories for coding were developed after systematically going through the text and identifying themes. The responses were analysed again, and statements were then matched to the categories. Where participants commented on multiple themes, all themes were counted.

3.5 Alternative research method

Semi-structured interviews were considered as an alternative research method to questionnaires. Bell states that one of the major advantages of interviews is their adaptability; the interviewer can investigate answers more fully by probing responses as well as interpret respondents' body language and tone, something which a rigid questionnaire schedule is unable to do (2010, p. 116). Interviews can yield rich qualitative data, and the respondent has the freedom to answer questions in their own words. However, the subjective nature of interviews means that bias can be a problem. Furthermore, due to the time-consuming nature of conducting interviews and analysing the transcripts, it would only have been possible for the researcher to interview a small sample of people. The aim of the research was to gain a wide overview of mobile device ownership amongst students with a view to implementing mobile library services. Questionnaires were deemed more suitable for the fact-finding nature of the research as well as for gathering a wide range of responses. It was considered important to also include open-ended questions to give respondents the opportunity to expand on their answers but also to gain richer qualitative data.

3.6 Justification for research methods

As previously mentioned, a quantitative approach was deemed most suitable for this study. Using a quantitative approach enabled the researcher to obtain a larger number of responses than a qualitative method, such as interviews, would have allowed. The appropriateness of the research method was also determined by looking at the research instruments of other similar studies including The University of Sheffield ("Student mobile device survey 2011", 2011), The University of Kent ("Information Services mobile device survey 2012", 2012), The University of Leeds ("How do you want your mobile library", 2012) and The University of Northampon (Adel, 2014).

3.7 Population and sampling frame

The population for the research comprised all of the students who attended Shipley College. This included both part-time and full-time students, and a range of ages from sixteen upwards. The study employed a purposive sampling technique. The aim of this sampling method is to "sample cases/participants in a strategic way, so that those sampled are relevant to the research questions that are being posed" (Bryman, 2008, p. 415). Although purposive sampling is a non-random sampling technique, efforts were made to ensure variety in the sample by distributing it at different times of the day.

3.8 Ethical considerations

The study was designed in accordance with the following ethical procedures:

- The British Psychological Society's - Code of Ethics and Conduct

- Department of Information Studies, Aberystwyth - Ethics Policy for Research

Informed consent was obtained prior to conducting the research. The British Psychological Society emphasise the importance of giving participants "sufficient information about the research in an understandable form" (2010, p. 18). The information letter which accompanied the questionnaire was piloted on two students. It was agreed that a 'question and answer' format was the most effective at communicating clearly the purpose of the study and the rights of the participants. The information letter can be seen in Appendix C. As the research was undertaken with a view to implementing mobile library services, this was made explicit in the information letter, as well as the fact that the results would be shared with the researcher's line manager. The information letter emphasised that their participation was voluntary and their identity would remain anonymous. Contact details were provided for the researcher should the participants want to query any aspect of the study.

The research population included participants in the 16 – 19 age bracket. The British Psychological Society states that "Special safeguards need to be in place for research with vulnerable populations" (2010, p. 31). Although the research participants were over the age defined as minors by the British Psychological Society, it was considered best practice to seek permission from the college principal, who was acting 'loco parentis'. His email granting this permission is attached as Appendix A. Approval from the Department of Information Studies is attached as Appendix B.

3.9 Limitations

There are potential problems to using questionnaires as a survey instrument. In order to reach a greater audience, a decision was made to send the questionnaire in both print and online

form, but there was a lack of contact between the researcher and the participants with the online survey in particular. Contact details for the researcher were included in a covering letter, and a pilot study was conducted in order to highlight and rectify any ambiguities in wording. However, due to lack of contact the researcher could not be completely confident that the participants understood all of the questions fully. Furthermore, open questions can be problematic to code. Bryman argues that coding open questions can be an unreliable process as the potential for variability in the coding of answers can result in measurement error (2008, p. 232). A disclaimer preceded both versions of the survey asking recipients not to fill it in if they had already completed it in a different format. However, it is possible that this guidance could have been ignored and both versions were completed by the same individual.

The study employed a purposive sampling technique so that the population sampled was relevant to the research questions. However, purposive sampling is a non-random method, and consequently the results cannot be generalised to the wider population, resulting in low external validity for the study.

3.10 Conclusion

This chapter has outlined the methodical approach adopted by the researcher. A predominantly quantitative approach was used, although it also contained some qualitative elements in the form of open-ended questions. Questionnaires were chosen as the survey instrument in line with other similar studies and due to the breadth of responses required. Ethical considerations have also been discussed, particularly as the research involved working with those in the 16 – 19 age range. Due to the fact that a non-random sampling method was used, the study has low external validity. However, the data will be used to

influence the development of mobile library services at Shipley College. The data from the research is presented in the next chapter.

Chapter 4: Results

4.1 Introduction

This chapter describes the results of the questionnaire distributed to students at Shipley College in order to ascertain whether there is a demand for mobile library services. The results are presented in line with the five objectives set out in chapter one:

1. To gain knowledge of the range of mobile devices owned by students at Shipley College.
2. To gain insight in to how students at Shipley College are currently using their mobile devices.
3. To investigate any barriers to implementing mobile library services, such as cost and lack of awareness of library services.
4. To gauge students' opinions of using their mobile devices for library services in order to predict likely take-up and demand for such services.
5. To ascertain which potential mobile library services should be considered for implementation, in line with student feedback.

The findings will be described separately under each objective. Analysis of the results in relation to the existing literature will follow in the next chapter.

4.2 Response rate and sample description

The questionnaire was distributed online and in print. The population for the study included all students at Shipley College. The sample was made up of full-time and part-time students. It included adult learners as well as those in the 16-19 age bracket. As anticipated, the

response rate for the online questionnaire was low, with 34 completed questionnaires being returned. This may be attributed to the fact that many students have not activated their college email account as they choose to use personal accounts instead. The online questionnaire was emailed to every person currently registered as a student at Shipley College, a total figure of 3,284. The print questionnaire yielded a much better responses rate. 120 questionnaires were distributed and 104 were returned (86.7%). Five incomplete questionnaires were discarded.

4.3 Findings

4.3.1 Objective one

The first objective was to discover what mobile devices were owned by students at Shipley College.

4.3.1.1 Devices owned by participants

Question one provided a list of seven mobile devices and asked participants to tick all that they owned or were planning to own in the next two years. Figure 4.1 illustrates the range of devices owned. Smartphones were the most popular devices with 91.7% of participants ticking ‘yes’ for this option, followed by laptops at 88.7% and MP3 players at 73.6%. A further 3.7% of respondents said they planned to own a smartphone in the next two years. In contrast, only 13.5% indicated that they owned a non web-enabled phone. Just over half of the respondents stated that they owned a tablet computer (53.3%), whereas e-book readers and netbooks were owned by 24% and 13.5% of respondents respectively. Overall, mobile device ownership was high, with an average of 3.5 devices owned per respondent.

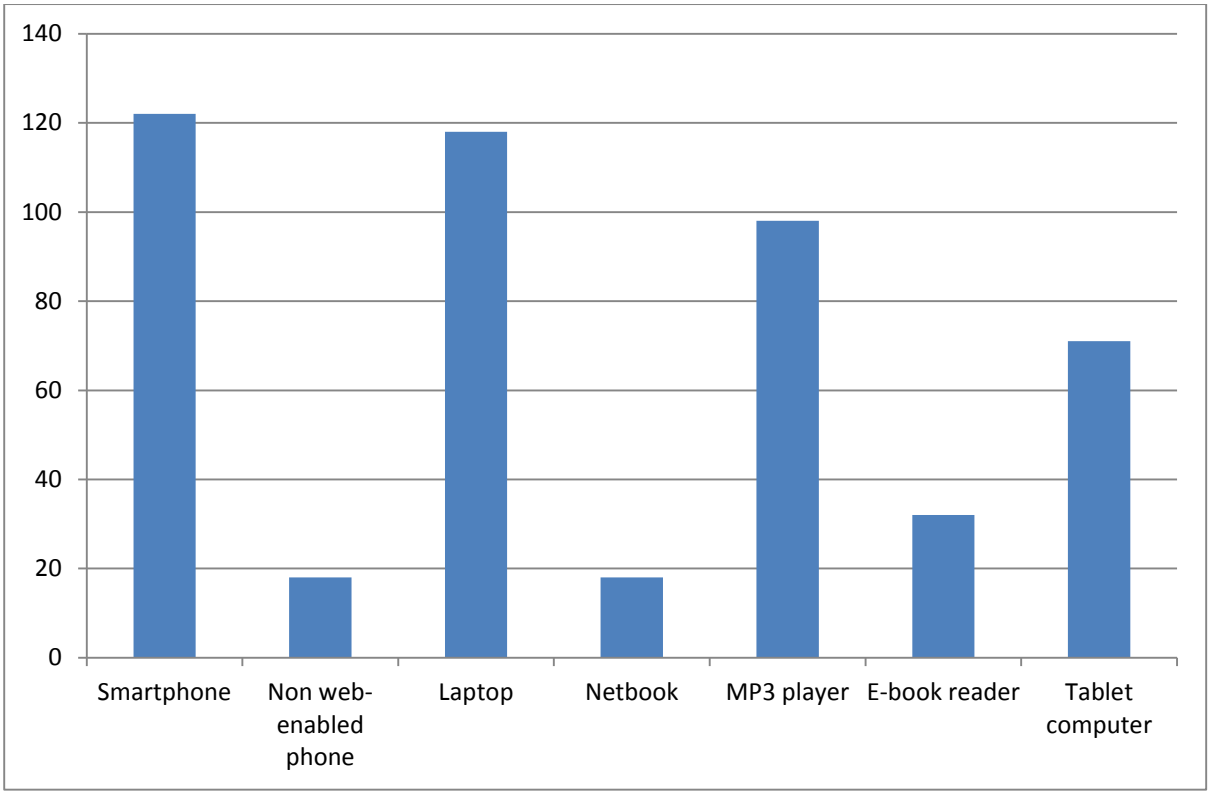

Figure 4.1: Range of devices owned by participants

4.3.2 Objective two

The second objective was to gain insight in to the range of tasks being carried out with mobile devices.

4.3.2.1 Range and frequency of tasks carried out with mobile devices

Questions 4 – 8 provided respondents with a list of tasks and asked them to tick all that applied for each device they owned. Non web-enabled mobiles and MP3 players were excluded as most of the categories wouldn't have applied due to the nature of the device.

Smartphones

The stacked column chart in Figure 4.2 demonstrates the frequency of tasks carried out with a smartphone.

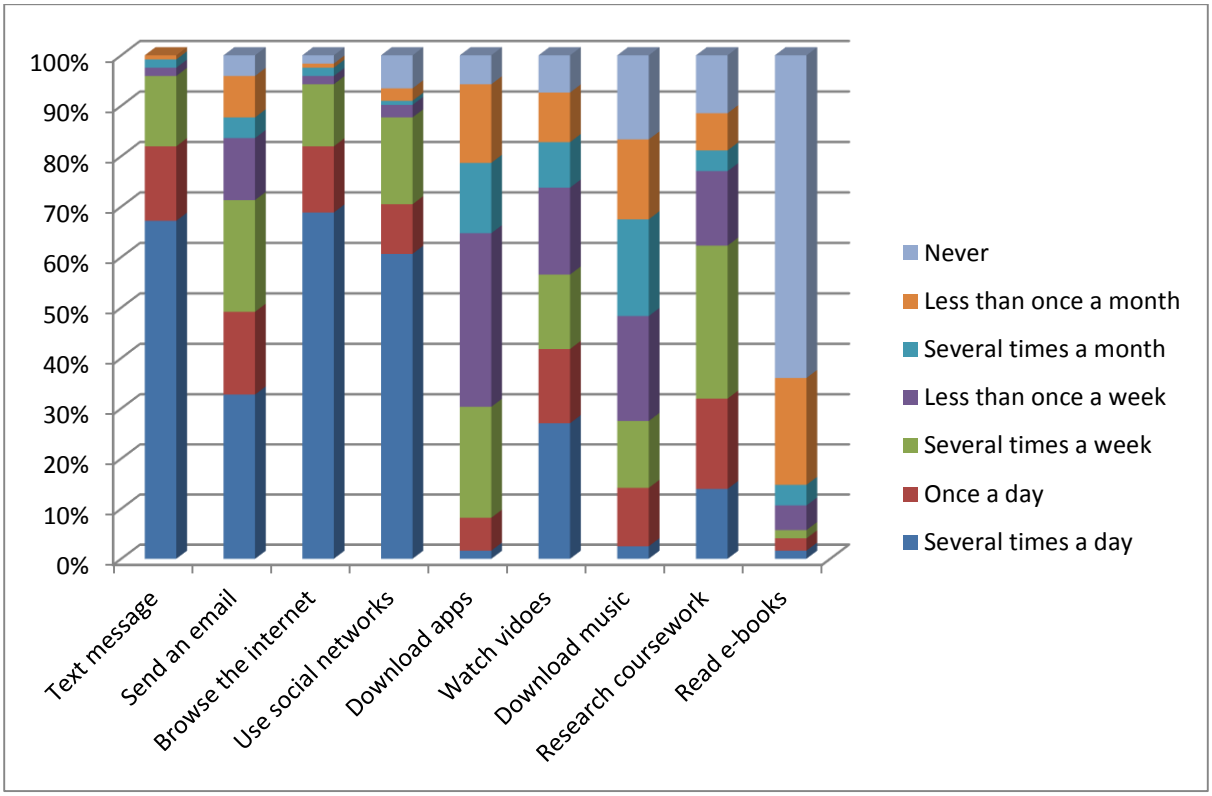

Figure 4.2: Frequency of tasks carried out with a smartphone

As is evident from the chart, smartphones were used for a multitude of tasks on a daily basis. The most popular activities were browsing the internet, text messaging and using social networks. Just over two-thirds (67.2%) of respondents stated that they texted several times a day. No respondent selected 'never' for this category. A high proportion (68.8%) of respondents browsed the internet several times a day and 60.6% of participants accessed social networks several times a day.

The highest reported response for sending an email was also ‘several times a day’ (32.7%). 94.2% of participants have downloaded mobile apps with their smartphones, although this tended to happen less frequently than the previously mentioned activities. Apps were most commonly downloaded less than once a week (34.4%). The majority of respondents watched videos on their phones, with varying frequency.

83.6 % of smartphone owners stated that they have downloaded music on their smartphone. This tended to happen less frequently than the more popular activities with only 2.5% ticking ‘several times a day’ and 11.5% selecting ‘once a day’. The most popular response was less than once a week (20.5%). 88.5% of respondents stated that they have used their phones to research coursework, indicating that smartphones were being used for educational purposes. This was most likely to happen several times a week (30.3%) followed by once a day at 18%. Reading e-books was the least popular reported activity, with 63.9% selecting ‘never’ and 21.3% stating ‘less than once a month’.

Laptops

Figure 4.3 demonstrates the range and frequency of reported activities which are carried out with a laptop. Browsing the internet and using social networks were popular activities. Participants reported that they mostly browsed the internet several times a week (44.1%) followed by once a day at 23.7%. Social networks were most often accessed several times a week (32.2%).

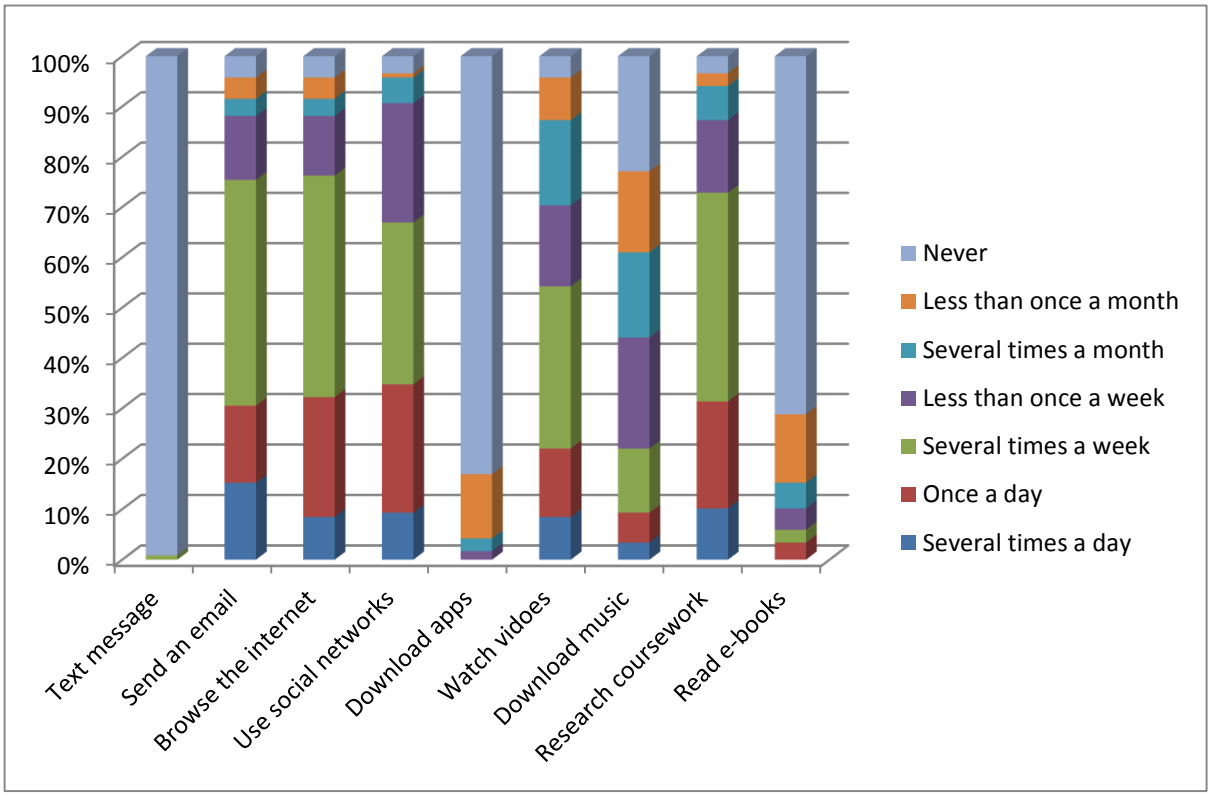

Figure 4.3: Frequency of tasks carried out with a laptop

The majority of laptop owners used their devices to send emails. Like browsing the internet and connecting to social networks, this most frequently happened several times a week (44.9%). 95.8% watched videos on their laptops with 32.2% ticking several times a week, followed by 16.9% selecting 'several times a month'. 77.1% of respondents have downloaded music to their laptops.

Most of the participants (96.6%) used their laptops to research coursework, with several times a week being the highest reported response (41.5%). The majority did not download apps frequently, with 83% ticking 'never' and 12.7% opting for 'less than once a month'. Most of the respondents did not use laptops to read e-books with 71.2% selecting 'never'. Apart from text messaging and downloading apps, many of the tasks carried out with laptops

are similar to those carried out with smartphones, but with less frequency. This may be attributed to the fact that although laptops are mobile, they are less portable and immediately available as smartphones are.

Netbooks

18 (13.5%) of the total participants stated that they owned a netbook. Figure 4.4 illustrates the range and frequency of activities carried out with a netbook. Like laptops, for many of the tasks 'several times a week' was the highest reported response. 38.9% of netbook owners sent an email several times a week with another 38.9% sending them less than once a week. The highest reported response for browsing the internet was several times a week at 50%. Similarly, 61.1% stated that they accessed social networks several times a week, whilst 50% also stated that they watched videos several times a week. Furthermore, respondents were most likely to research coursework several times a week (44.4%) followed by less than once a week (33.3%). Downloading music was a less popular activity with 50% of participants selecting 'never', and no text messages were sent via netbooks. Just over a fifth (22.2%) of respondents have downloaded apps, and all selected the option 'less than once a month'. 44.4% stated that they have read e-books with their devices, but this was also most likely to happen less than once a month (33.3%).

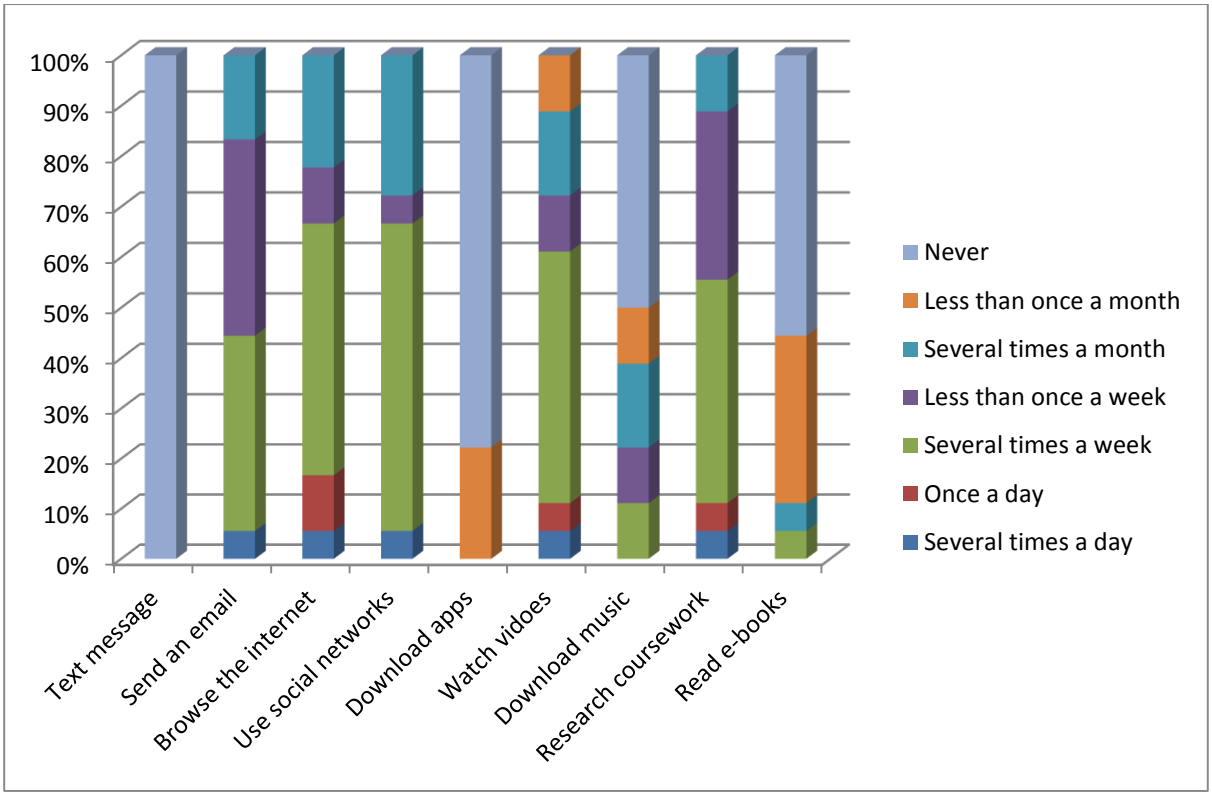

Figure 4.4: Frequency of tasks carried out with a netbook

E-book readers

Just under a quarter (24%) of the total survey participants owned an e-book reader. The frequency and variety of tasks performed on e-book readers are illustrated by Figure 4.5. Unsurprising, the main activity carried out on e-book readers was reading e-books. 62.5% stated that they read e-books once a day. 18.8% also used them to send emails, although all respondents ticked the category 'less than once a month'. 43.8% of respondents have accessed the internet on their e-book reader with the highest response being 'less than once a month' (18.8%) followed by 'several times a month' (15.6%).

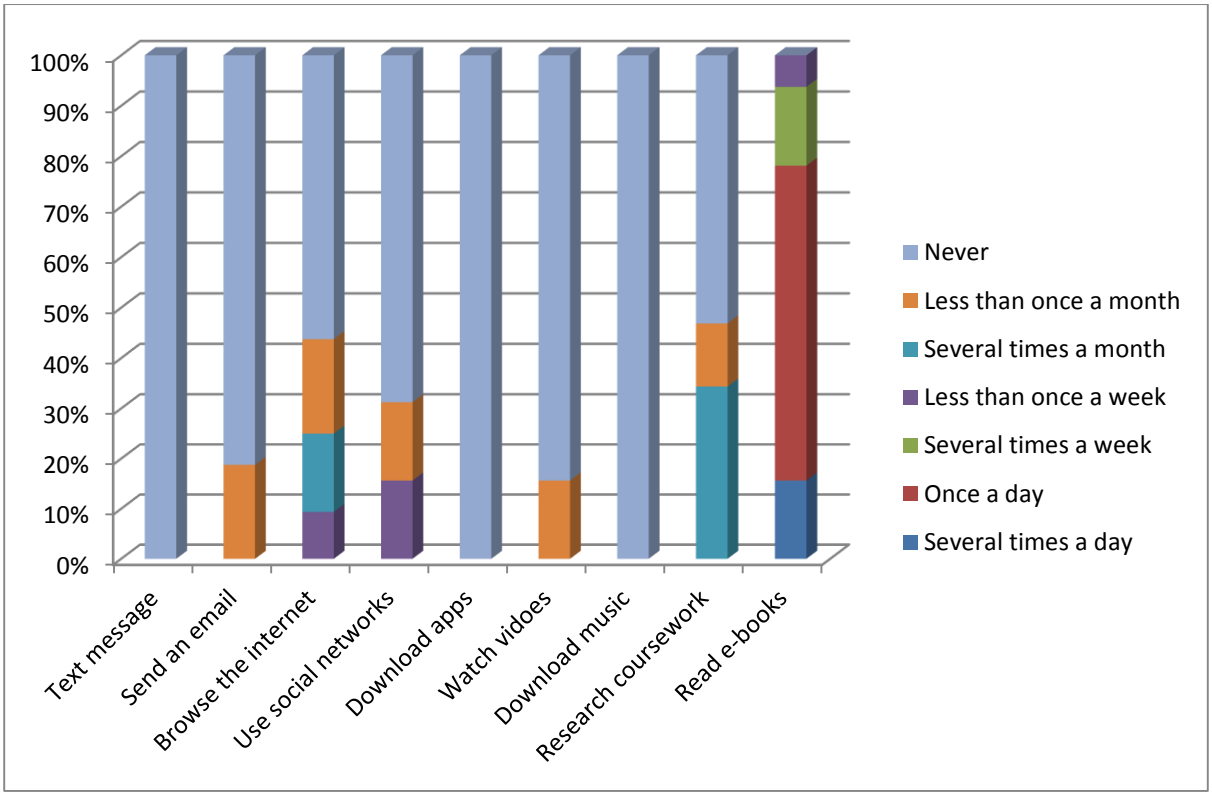

Figure 4.5: Frequency of tasks carried out with an e-book reader

Almost half of the participants used their devices to research coursework with the highest proportion of responses being in the 'several times a month' category (34.4%). Social networks have been accessed by 31.5% of respondents. 15.6% have watched videos, all of whom ticked 'less than once a month'. No respondents downloaded apps, sent a text message or downloaded music on their e-book readers. Overall, apart from reading e-books, e-book readers are used infrequently for other tasks. This may be due to the fact that some e-book readers only have very basic web browsers and may not be adequate for heavy internet use.

Tablet computers

Approximately half (53.3%) of the survey participants owned a tablet computer. Figure 4.6 shows the frequency and range of tasks carried out on tablets.

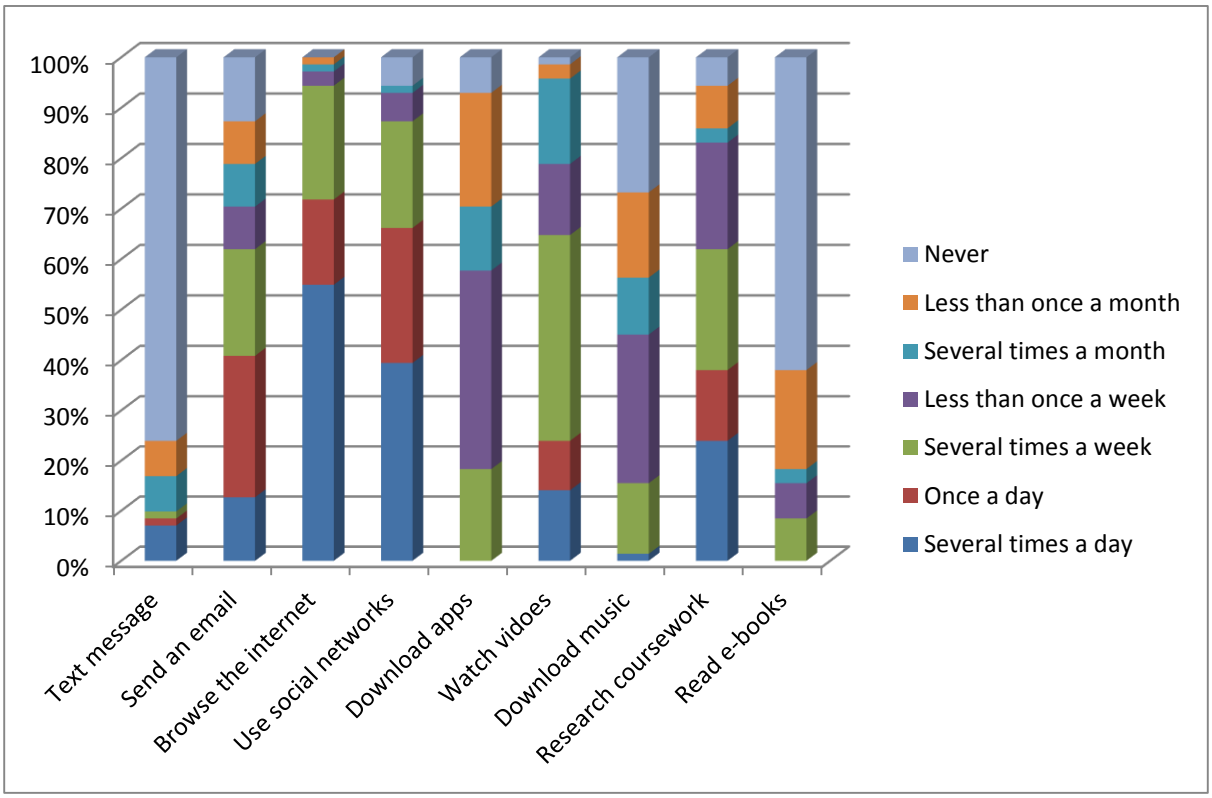

Figure 4.6: Frequency of tasks carried out with a tablet computer

The chart demonstrates that they are flexible devices. Tasks were performed in every category with varying frequency. The most popular reported activity was browsing the internet. The majority of respondents accessed the internet frequently, with only one respondent selecting 'several times a month' and one respondent opting for 'less than once a month'. Connecting to social networks was also popular with 39.4% of participants accessing them several times a day. Emails were most likely to be sent once a day (28.1%) followed by several times a week (21.1%). 93% of tablet owners have downloaded apps, most commonly

less than once a week (39.4%). All of the respondents, except for one, watched videos on their tablets and 73.2% have downloaded music. The majority of respondents used their tablets regularly to research coursework with a fairly even distribution of answers across the first four frequency categories, ranging from several times a day to less than once a week. The least performed activities were sending text messages (23.9%) and reading e-books (38%). Like smartphones, the findings indicate that tablets are versatile devices that can be used for a broad range of tasks.

4.3.2.2 Most important tasks carried out on mobile devices

Question 9 was an open question, and its aim was to discover what respondents thought was the most important task that they performed on their mobile devices. It was hoped that this would provide useful insight when considering which mobile library services to implement. 75 participants (56.3%) provided a response to this question. The number of response categories highlights the wide and varied range of tasks that users are carrying out with mobile devices. Table 4.1 summarises the main response categories. The convenience and accessibility of mobile devices was highlighted by several respondents:

> 'It allows me to be in constant contact with other students so we can bounce ideas off each other when it comes to essay titles or assignments. I can always browse the net fast for answers rather than having to access the internet at home or college or even the library.' (Respondent 21)

> 'Access my music, photos and games anywhere' (Respondent 103)

Question 9 - What is the most important thing(s) that your mobile device allows you to do?	No. of responses	%
Send and receive text messages	12	16
Access email account	8	10.6
Access social media	20	26.6
Stay in contact with people	9	12
Access the internet	23	30.6
Listen to music	5	6.6
Watch and download videos	8	10.6
Make phone calls	1	1.3
Photo messaging	2	2.6
Instant messaging	5	6.6
Play games	9	12
Download apps	2	2.6
Make video calls	3	4

Table 4.1: Main response categories for question 9

Only one respondent mentioned the traditional task of making phone calls, although this may be implicit in the category 'stay in contact with people'. The most popular tasks listed were 'access the internet' (30.6%) followed by 'access social media' (26.6%) and 'send and receive text messages' (16%). Several respondents used terms such as 'quick' and 'quickly' underlining how instantly tasks can be carried out with mobile devices in comparison to more static technology, such as desktop computers. Some of the comments stating the most popular tasks are listed below.

Access the internet

‘Access the internet when away from a computer’ (Respondent 4)

‘Check emails and quickly check information on the internet, like bus times’ (Respondent 60)

‘Quick internet access’ (Respondent 67)

Access social media

‘Use Facebook and instagram. Use Facebook messenger alot’ (Respondent 11)

‘Check e-mails and social media’ (Respondent 98)

‘Probably going on Facebook and Twitter’ (Respondent 108)

Send and receive text messages

‘I send loads of texts. Probably about 50 a day!’ (Respondent 95)

‘Text and use messenger app (Respondent 126)’

4.3.2.3 Mobile apps

The purpose of question 10 was to gain insight in to the variety of mobile apps used by students at Shipley College. The pros and cons of creating an app rather than a mobile website were discussed in the literature review, so discovering how students were using apps would help to determine whether creating one would be a viable option. 115 (86.5%)

participants answered this question. The number of responses given for each category of mobile app can be seen in Figure 4.6.

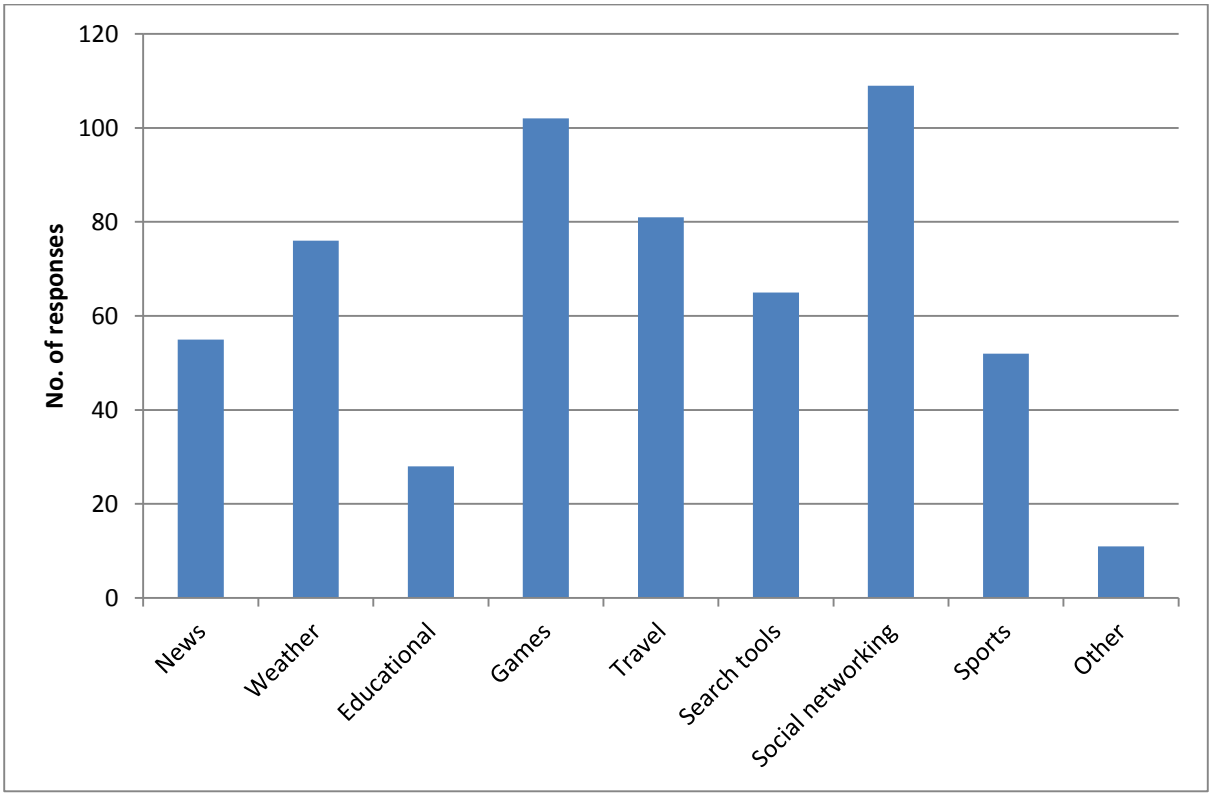

Figure 4.7: Mobile apps used by participants

The array of apps being used highlights the diversity of activities which are carried out with mobile devices, ranging from gaming to searching for travel information. The most popular apps were social networking (94.8%), games (88.7%), travel (70.4%) and weather (66.1%), demonstrating that they have both a recreational and practical function.

Responses in the other category were as follows:

- Messaging apps
- Productivity apps
- Notes apps
- Photography apps
- Shopping apps

Question 11 was an open question inviting participants to comment further on mobile apps. This question had a low response rate with 7 respondents providing an answer. One respondent found them particularly useful for managing tasks at college:

> ‘I find them extremely helpful for my college work. Eg I use Facebook to make groups and use these to plan and manage group projects. I also use Pinterest to gather together ideas and examples of work that would help me in projects. I use voice memo to record meetings etc, which also helps me with my work. Calendar and email on a mobile platform are invalable.’ (Respondent 21)

Others raised concerns about privacy and problems with design:

> ‘I don’t use apps such as facebook because I’ve heard that they access your private information. I use the mobile sites instead’ (Respondent 46)

> ‘My only issue with mobile apps is that sometimes they contain bugs, or sometimes they don't even work. Some apps cost and they don't give you the option of a trial run before commiting’ (Respondent 131)

Two respondents mentioned the issue of cost, stating that they only download apps if they are free. Other responses referred to the transient nature of apps:

‘I download apps alot but regularly go through them and delete ones I don’t use’ (Respondent 8)

‘Some I download for brief periods of time, however they go out of trend’ (Respondent 20)

4.3.3 Objective three

The third objective explored whether there could be barriers to implementing mobile library services. This included cost issues, both for the LRC and for students using their devices, as well as barriers due to lack of awareness of services.

4.3.3.1 Cost of accessing the internet on mobile devices

The literature review revealed mixed findings as to whether the cost of using the internet on mobile devices limits how they are used. Question 2 asked respondents to state whether they had limited, unlimited or no mobile internet allowance, and the results can be seen in Figure 4.8. As is evident from the chart, the majority of respondent had limited mobile internet allowance, with approximately a third stating that they had an unlimited allowance. However, a limited allowance doesn’t necessarily restrict how mobile devices are used, so question three used an open question format to investigate this issue. This question had 69 non-responses, although this also included the 43 participants who had an unlimited allowance and 8 who had no internet access at all. The main response categories can be seen in Table 4.2.

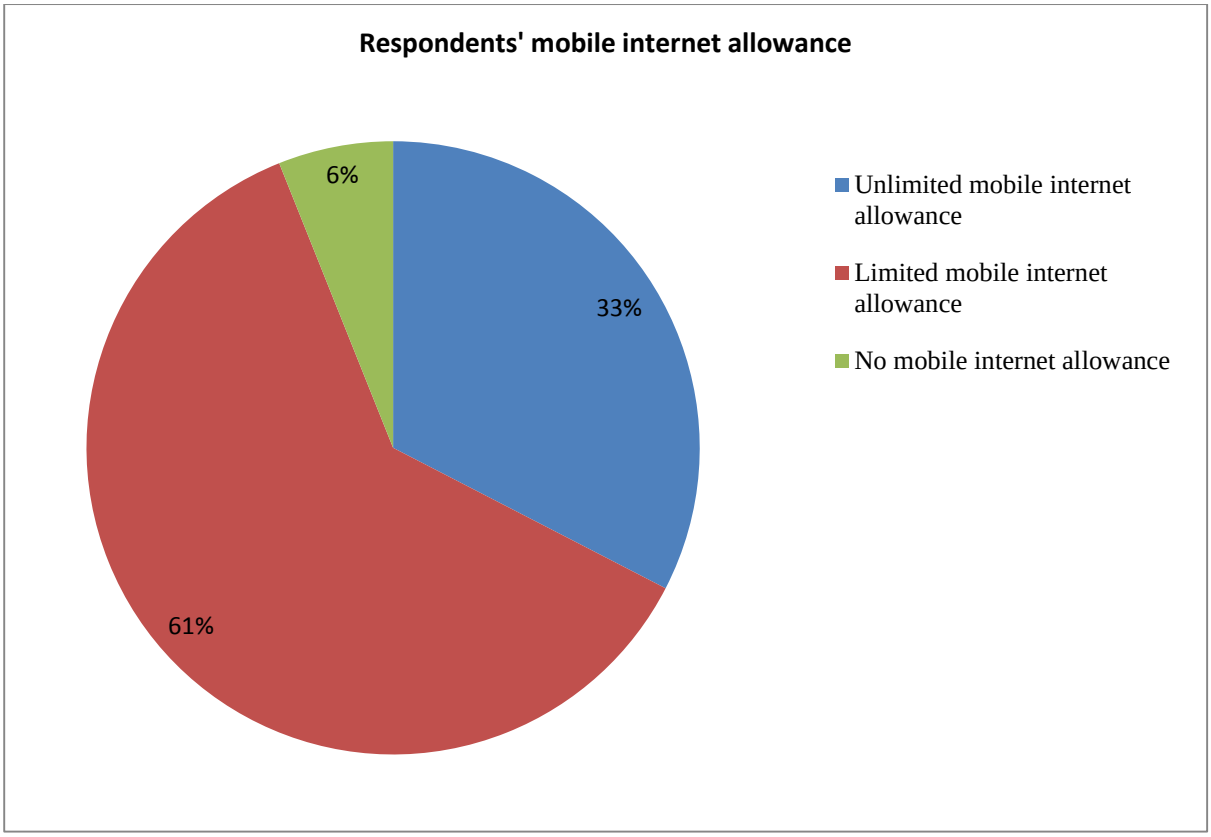

Figure 4.8: Pie chart showing respondents' mobile internet allowance

Question 3 – If you have limited mobile internet allowance, how does this affect the services you access on your mobile device?	No. of responses	%
It doesn't - allowance is limited but sufficient	16	25
Use WiFi when possible	23	35.9
Avoid or limit downloading	6	9.3
Monitor allowance	8	12.5
Limit or avoid watching videos	5	7.8
Limit time spent online	4	6.2
Limit time spent streaming music	2	3.1

Table 4.2 Impact of a limited mobile internet allowance

Access to WiFi emerged as an important factor in allowing the respondents to stay within their allowance:

> ‘I try to connect to wifi where possible. I am cautious with what I download as I do not want to go over my allowance as it becomes expensive.’ (Respondent 11)

> ‘When not using wifi, I must be wary of my data usage in order to avoid extra costs.’ (Respondent 24)

> ‘I generally rely on using wifi wherever I go and just switch 3G on when I have to.’ (Respondent 82)

12% of respondents felt that although their allowance was limited, it was sufficient and didn’t impact on how they used their devices:

> ‘I don't go over my monthly limit and do not need to restrict to stay within it.’ (Respondent 13)

> ‘I have limited allowance but only ever use about half of it.’ (Respondent 64)

For 6 % of respondents, monitoring their usage was an important means of avoiding excess costs:

> ‘I get alerts if i go over my allowance.’ (Respondent 3)

> ‘I have set all services to queue data unless wi-fi is available to ensure that I do not run over my monthly limit, but I will occasionally manually override this if I need internet access using mobile data.’ (Respondent 28)

> ‘I am careful not to go over my allowance’ (Respondent 81)

Other effects of a limited mobile internet allowance included restrictions on watching videos, listening to music, downloading material and on the amount of time spent online:

‘Avoid video’ (Respondent 9)

‘I cannot stream music for long periods of time, e.g. soundcloud or spotify. I also can’t download large items.’ (Respondent 20)

‘It limits the time I spend online' (Respondent 58)

Overall, although a quarter of respondents stated that their allowance was sufficient for their needs, it is clear that for others having a limited allowance meant having to restrict certain activities and being mindful of their data usage.

4.3.3.2 Wireless network

Question 15 asked respondents whether they connected to the college’s wireless network with their devices. Figure 4.9 illustrates the proportion of responses for each category. As the chart illustrates, the majority of respondents do not connect to the college’s wireless network. Question 16 asked the 85 respondents who did not connect to WiFi to provide their reasons. This question received 76 responses, which could be broadly divided in to three categories as can be seen from Figure 4.10.

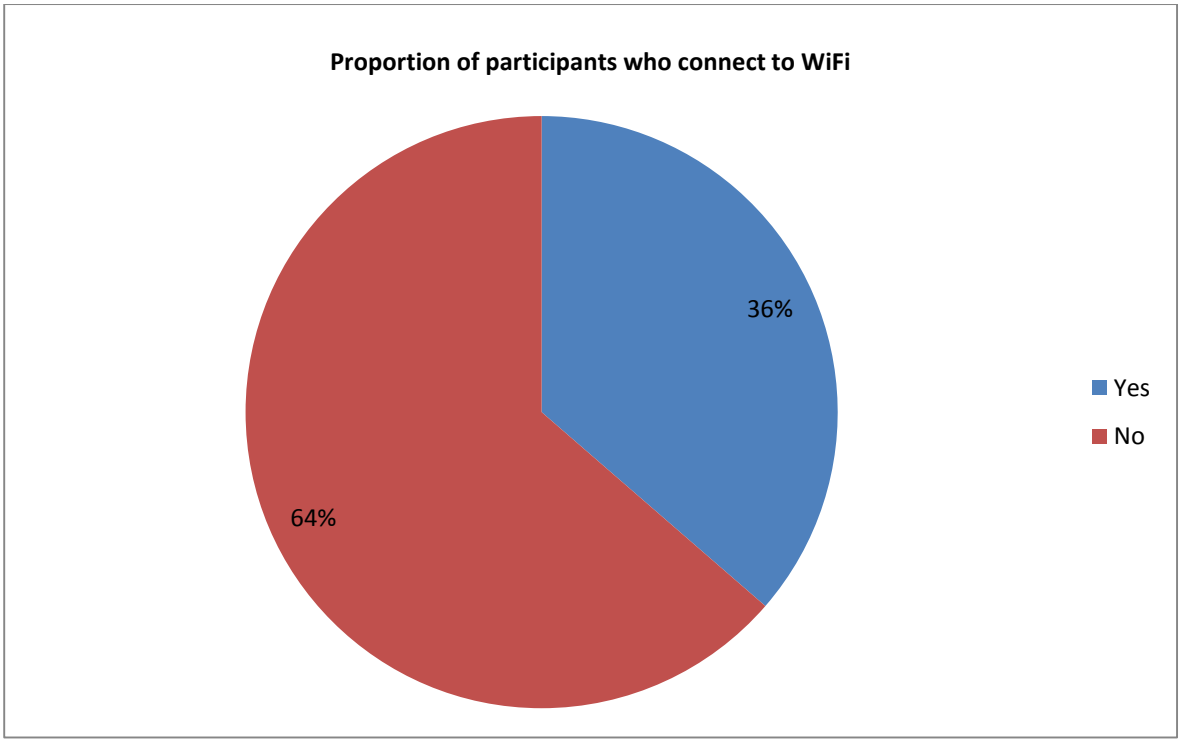

Figure 4.9: Pie chart showing the proportion of participants who connect to WiFi at college

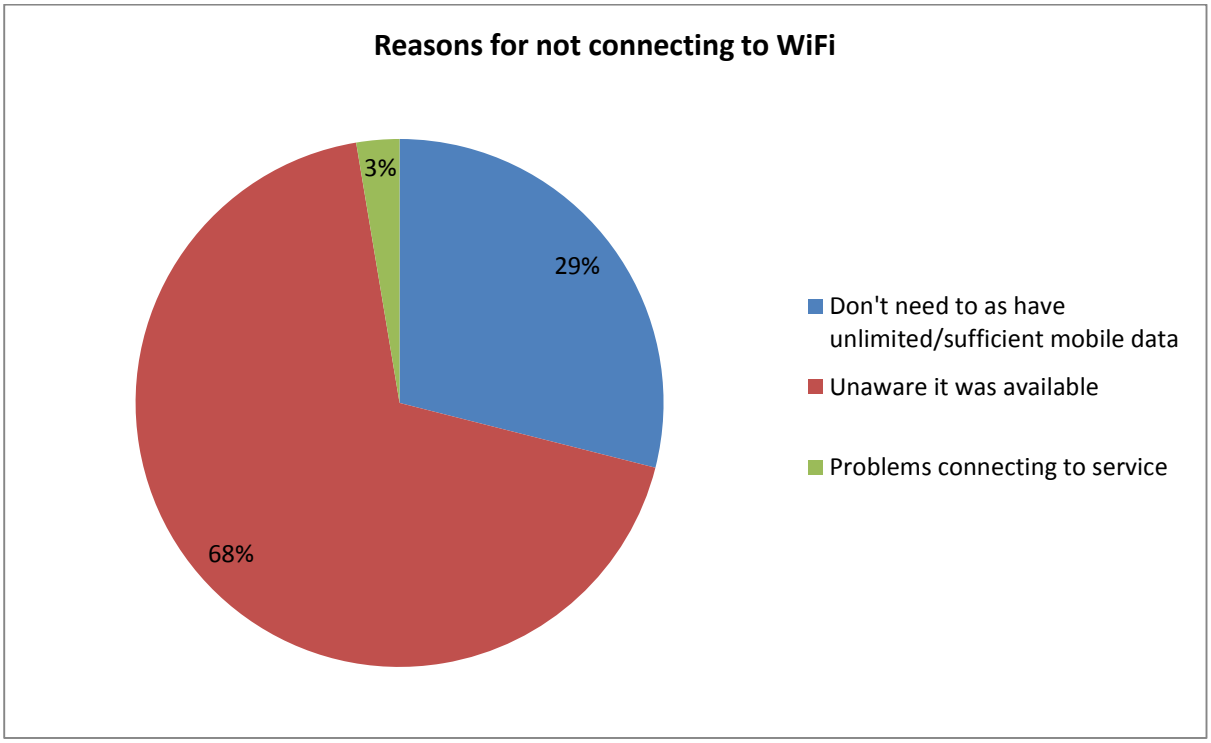

Figure 4.10: Reasons for not connecting to Wi-Fi network

68% were unaware that the WiFi network was available to them:

> 'I never knew the Wifi code for Shipley College therefore never used on my phone. If I did I would have used it much more often.' (Respondent 8)

> 'Didn't know I could. Would connect to it if I knew how.' (Respondent 98)

29% of respondents stated they had no need to connect to the wireless network as they had sufficient mobile internet allowance:

> 'I don't need to as I have all you can eat data' (Respondent 126)

The third category of responses related to problems connecting to the network. A further reported reason related to issues using mobile apps whilst connected:

> 'Sometimes social networking apps don't work so I log out' (Respondent 22)

4.3.3.3 QR codes

The literature review revealed that one of the main barriers to using QR codes effectively was lack of awareness of their purpose. Question 17 explored how much knowledge of QR codes existed amongst students at Shipley College. As figure 4.11 clearly demonstrates, awareness of QR codes is low with 63% of participants stating that they did not know what a QR code was.

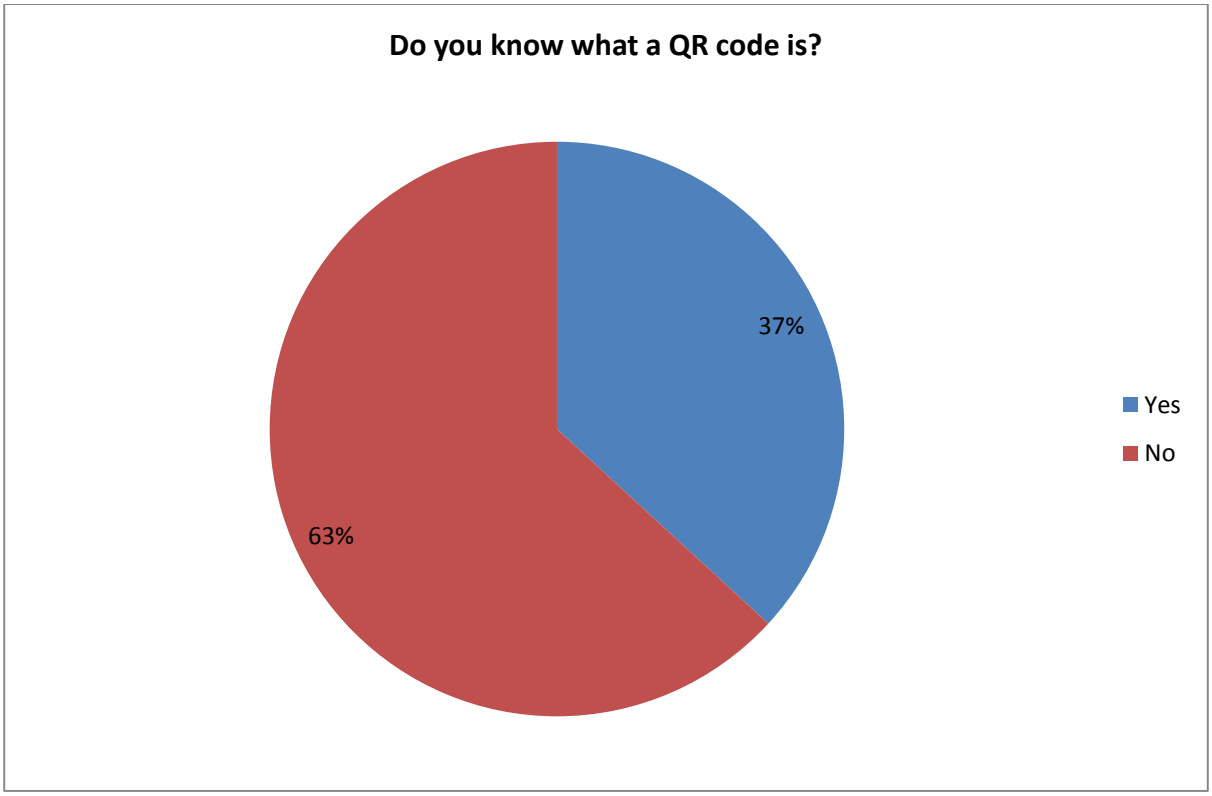

Figure 4.11: Pie chart demonstrating awareness of QR codes

Question 19 provided respondents with the opportunity to make additional comments on the topic of QR codes. Only 4 responses were provided, which is unsurprising given that such a high proportion of the participants did not know what they were. One respondent suggested that they are not always used effectively but do have a purpose:

> 'I think a majority of the time they seem to be used as a gimmick and not necessarily appropriately. They can be useful to flag up information and maybe to save things that then can be viewed at a later date' (Respondent 21)

Another concern raised was that there is not always a supporting infrastructure to allow them to work well:

‘Bit clunky and slow. Location doesn't always match with strong wifi service or the time or place that I would want to take action on the received information’ (Respondent 24)

4.3.3.4 Viewing and downloading e-books

The aim of question 14 was to investigate the proportion of students that were accessing e-books on their mobile devices. The results can be seen in Figure 4.12.

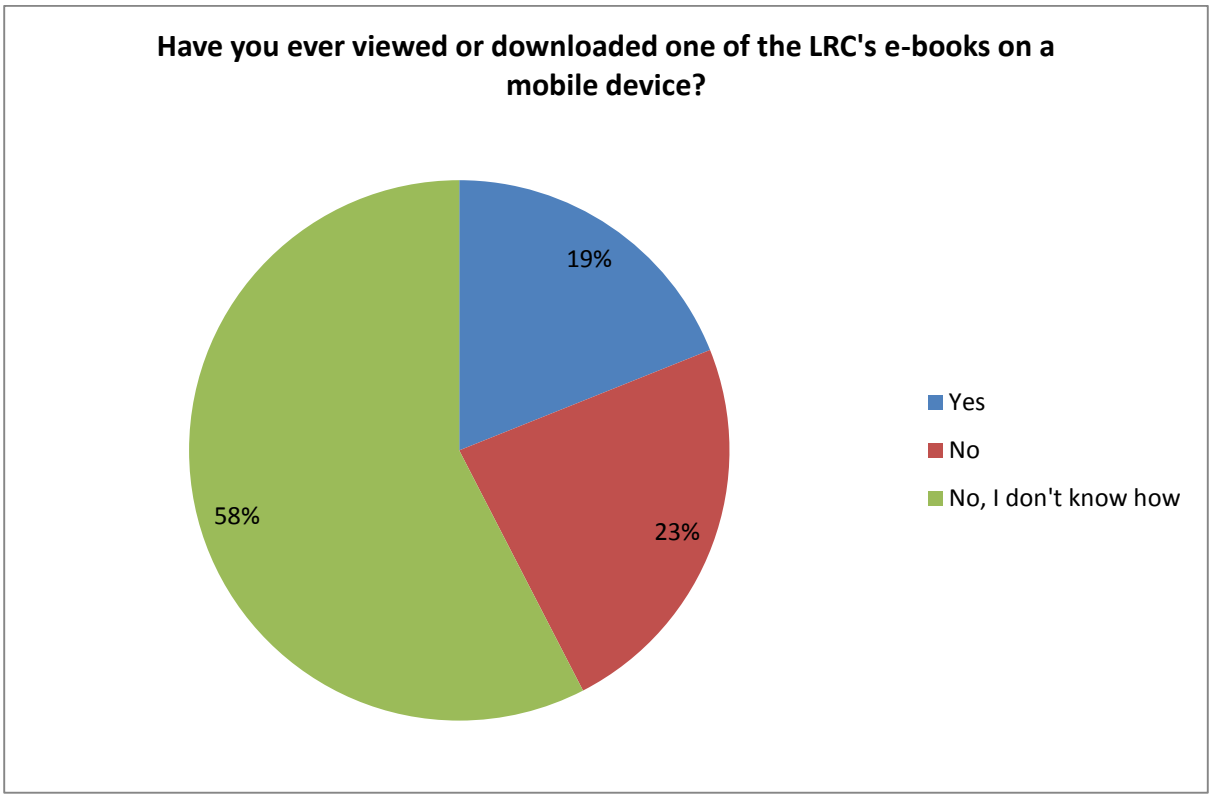

Figure: 4.12: Pie chart showing proportion of participants who have accessed e-books on mobile devices

Only 19% of respondents have viewed or downloaded the LRC’s e-books, and a significant proportion (58%) stated that they were unaware how to view them. The results of this

question reveal that there is a clear lack of awareness amongst many participants of how to access the LRC's e-books on a mobile device.

4.3.4 Objectives four and five

The final set of results will be examined in relation to objectives four and five together. Objective four seeks to predict demand for future mobile library services on the basis of student feedback. Following on from this, the purpose of objective five is to determine which mobile library services should be considered for implementation.

4.3.4.1 Proposed mobile website

Question 12 presented respondents with a list of six features of a potential mobile LRC website and asked them to rate the likelihood of using each feature on a five-point scale. Each feature will be examined separately in a series of bar charts. Figure 4.13 displays the responses to the first category 'check your library account'. Participants' opinion on the likelihood of using this feature was mixed. 61.7% stated that they would be likely to check their library account on a mobile site, with 40 respondents answering 'fairly likely' and 39 respondents selecting 'very likely'. However, over a quarter of participants (27.1%) selected the category 'not sure', suggesting a degree of uncertainness.

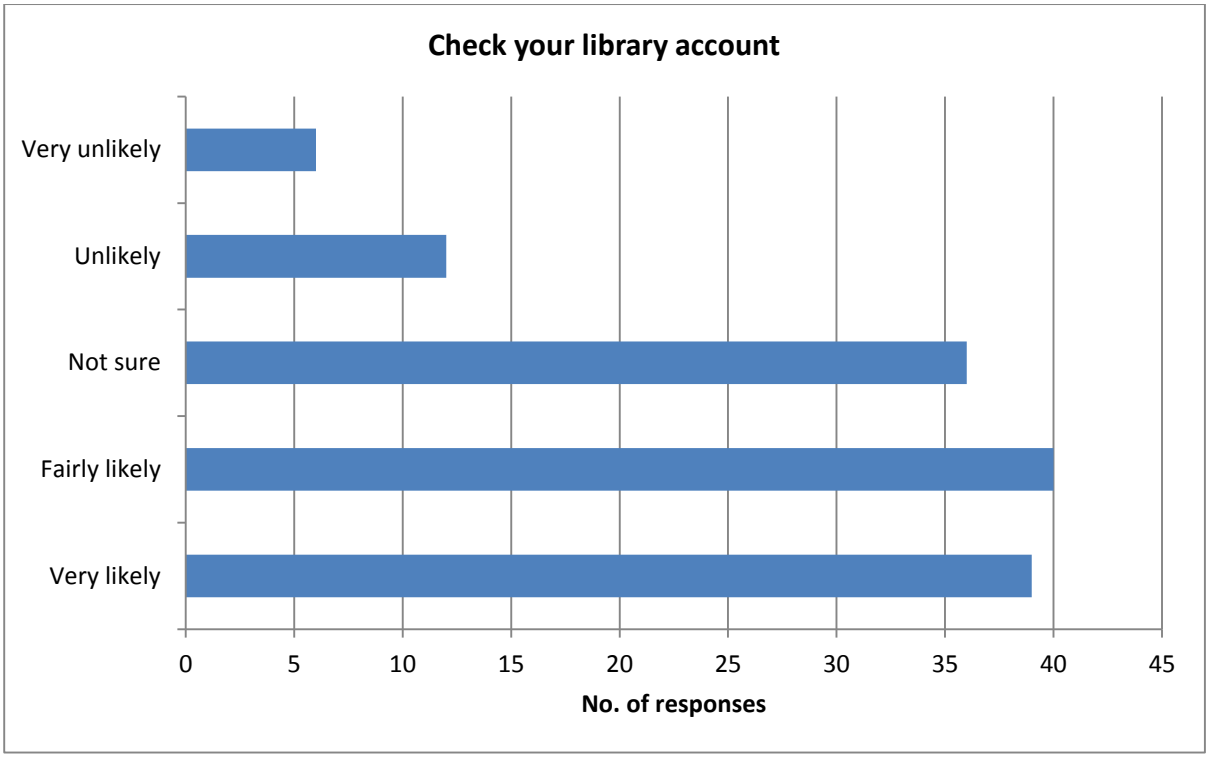

Figure 4.13: Responses to category 'check your library account'

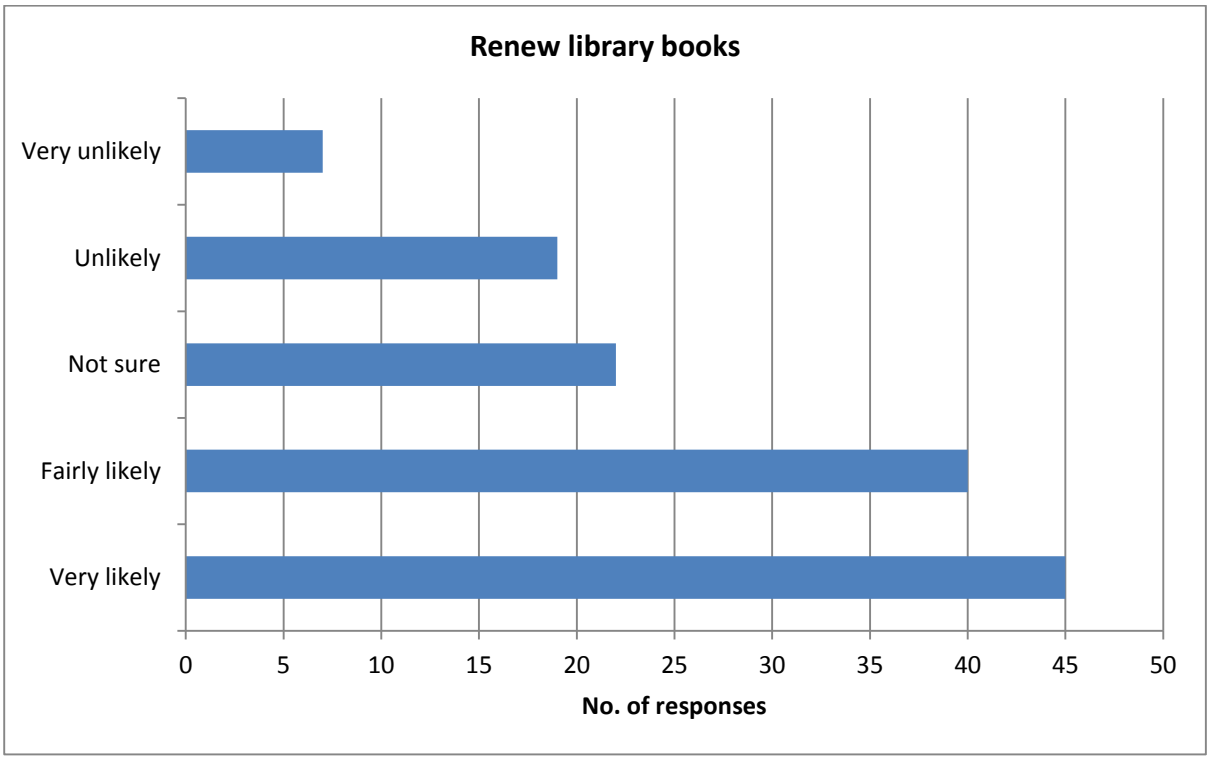

Figure 4.14: Responses to category 'renew your library books'

Responses to the category ‘renew your library books’ can be seen in Figure 4.14. A total of 63.9% of respondents stated that they would be ‘likely’ or ‘very likely’ to use this feature of a mobile site.

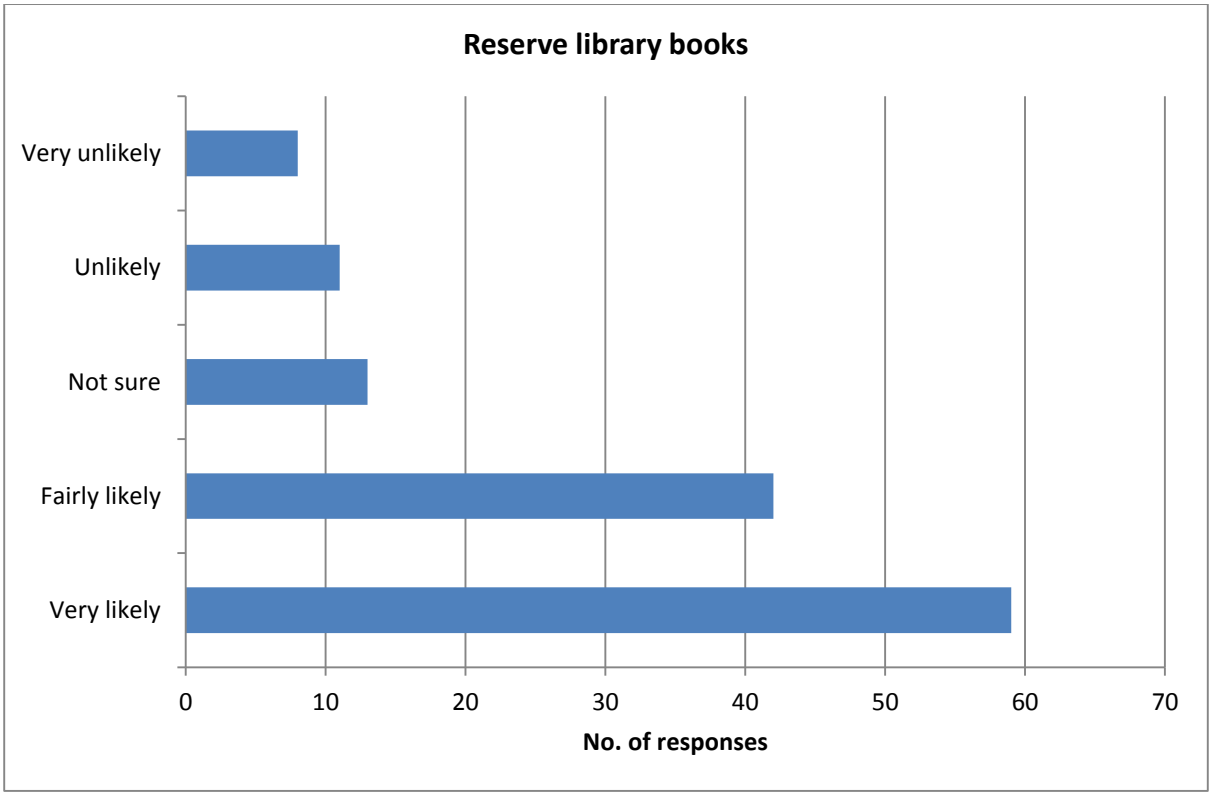

Figure 4.15: Responses to category ‘reserve library books’

Figure 4.15 illustrates the responses to the category ‘reserve library books’. This was a popular option with 44.4% selecting ‘very likely’ and a further 31.6% ticking ‘fairly likely’. A total of 14.3% of participants stated that they would be ‘unlikely’ and ‘very unlikely’ to reserve library books on a mobile website.

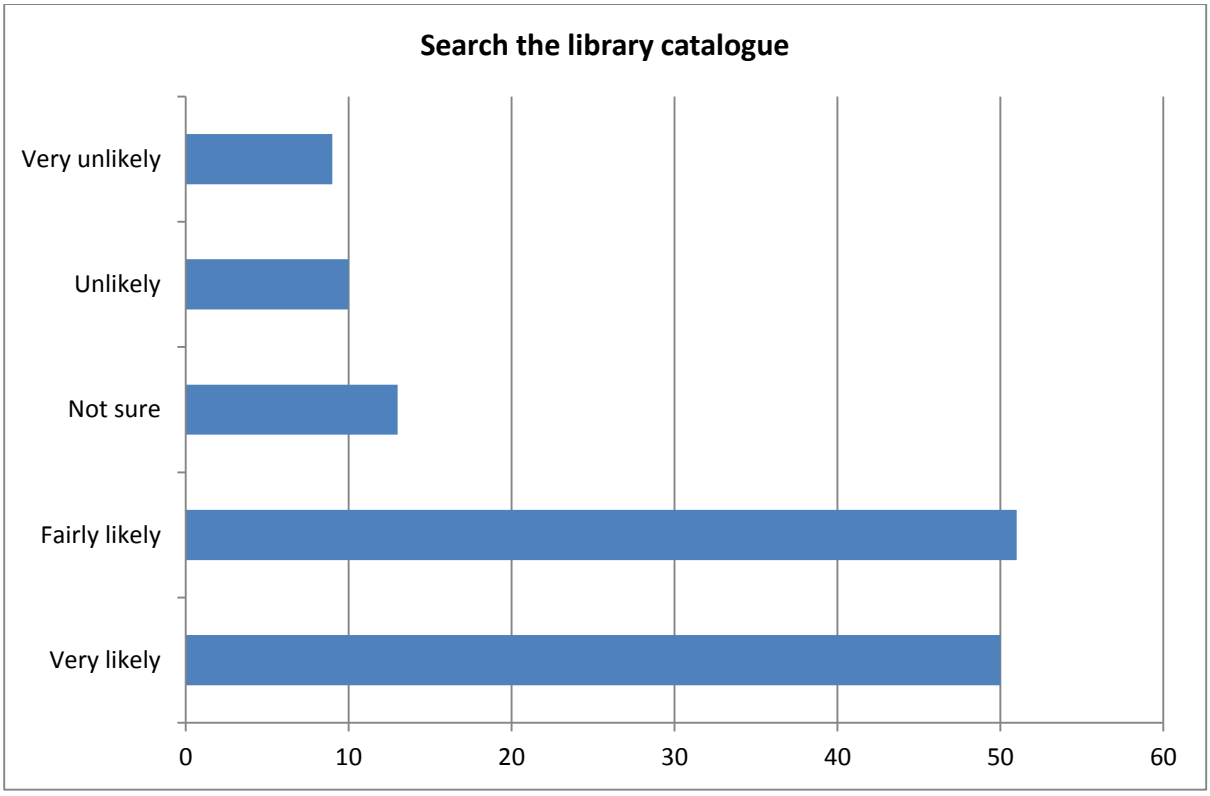

Figure 4.16: Responses to category 'search the library catalogue'

The responses to the category 'search the library catalogue can be seen in Figure 4.16. A majority (75.9%) of respondents would like to see this feature on a mobile website. A total of 14.3% would be unlikely or very unlikely to use this while 9.8% selected 'not sure'. Figure 4.17 shows the response range to the category 'read online books or articles'. This is also a popular category with 74.4% of respondents selecting 'very likely' or 'fairly likely'. Figure 4.18 illustrates responses to the category 'find library opening hours or contact details and a clear majority (78.9%) feel that having library opening hours or contact details on a mobile website would be a worthwhile feature.

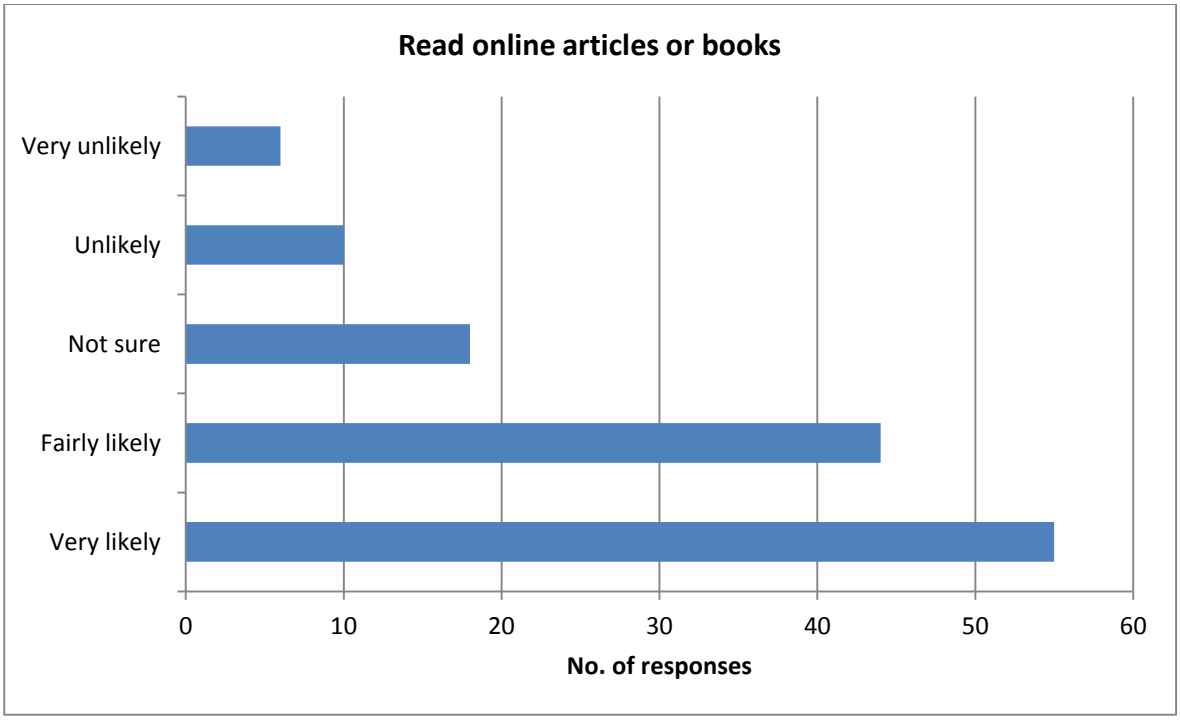

Figure 4.17: Responses to category 'read online books or articles'

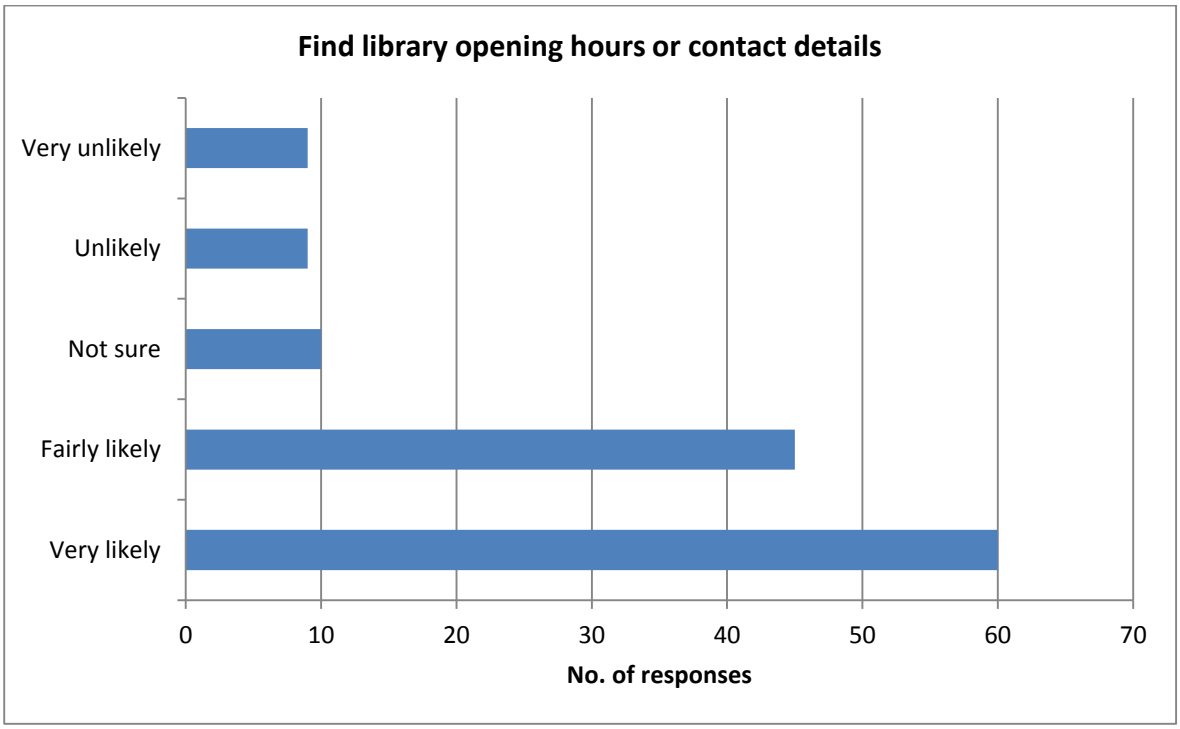

Figure 4.18: Responses to category 'find library opening hours or contact details'

4.3.4.2 Proposed mobile library services

Question 13 asked respondents to rate the likelihood of using particular mobile library services. They were asked to rate their answers on a five-point scale. Their responses are illustrated below in a series of bar charts.

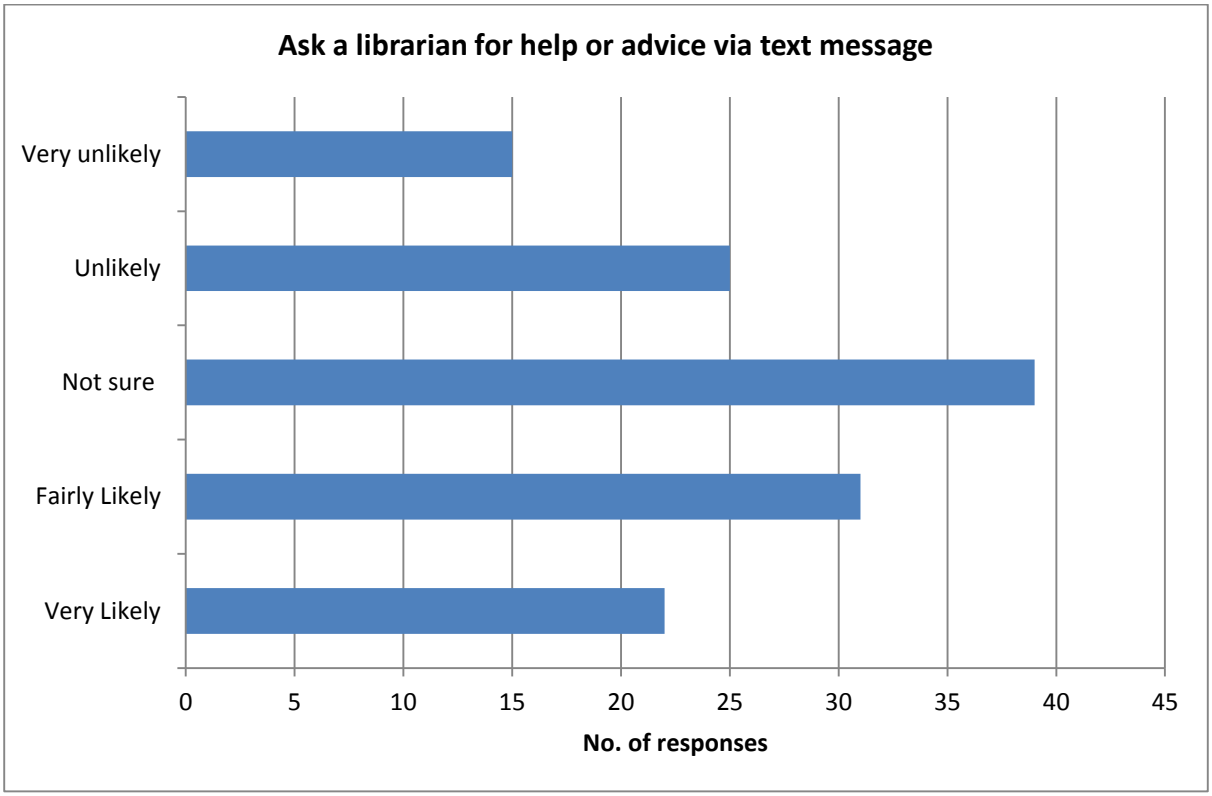

Figure 4.19: Responses to category 'ask a librarian for help or advice via text message'

As is illustrated in Figure 4.19, a large proportion of respondents expressed uncertainty about asking a librarian for help or advice via text message with 29.3% selecting 'not sure' A further 18.8% opted for 'unlikely' and 11.3% ticked 'very unlikely'. A total of 39.8% said they would be 'very likely' or 'fairly likely' to use this service.

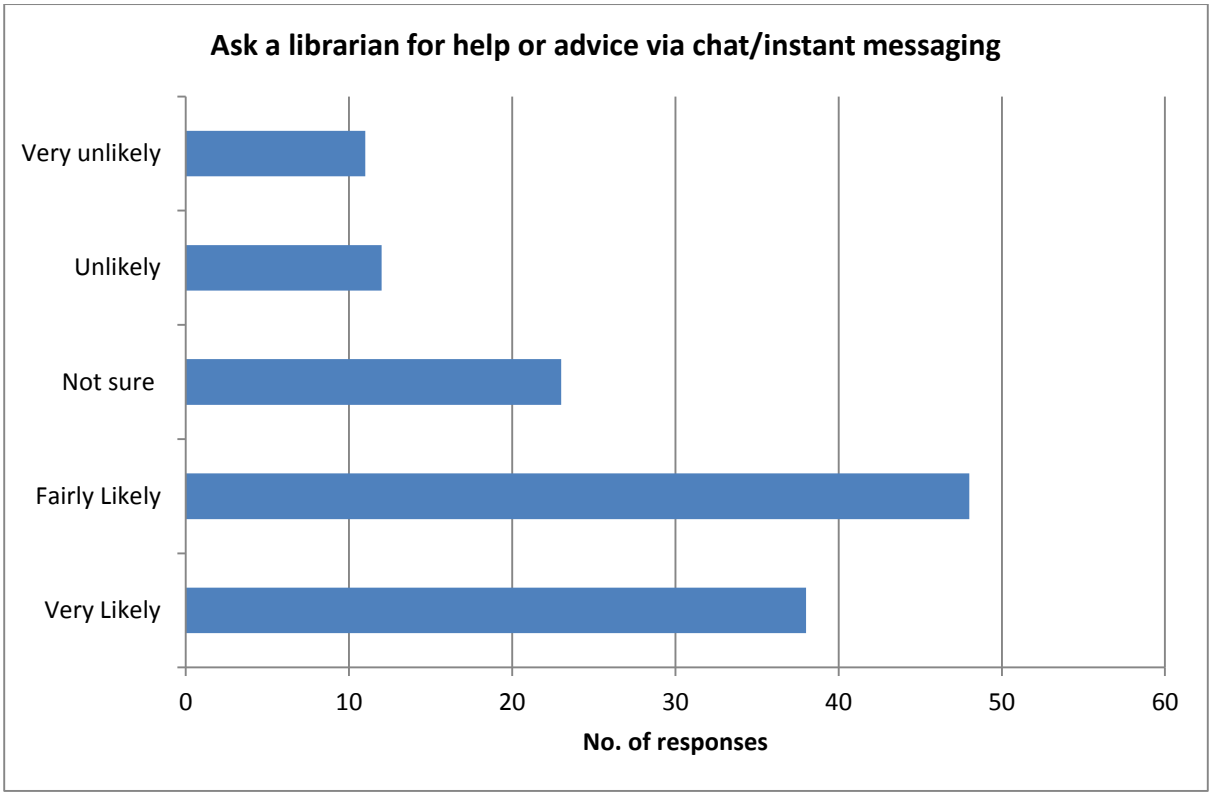

Figure 4.20: Responses to category 'ask a librarian for help or advice via chat/instant messaging'

As can be seen from Figure 4.20, asking for help via instant messaging was a more popular option than asking by text message. The highest response was 'fairly likely' (36.1%), followed by 'very likely' (28.6%). A total of 17.3% answered 'unlikely' or 'very unlikely', while the remaining 17.3% stated that they were 'not sure'.

The majority of respondents reported that they would be likely to receive text messages about overdue books with 76.7% selecting 'very likely' or 'fairly likely'. The range of responses can be seen in Figure 4.21 below.

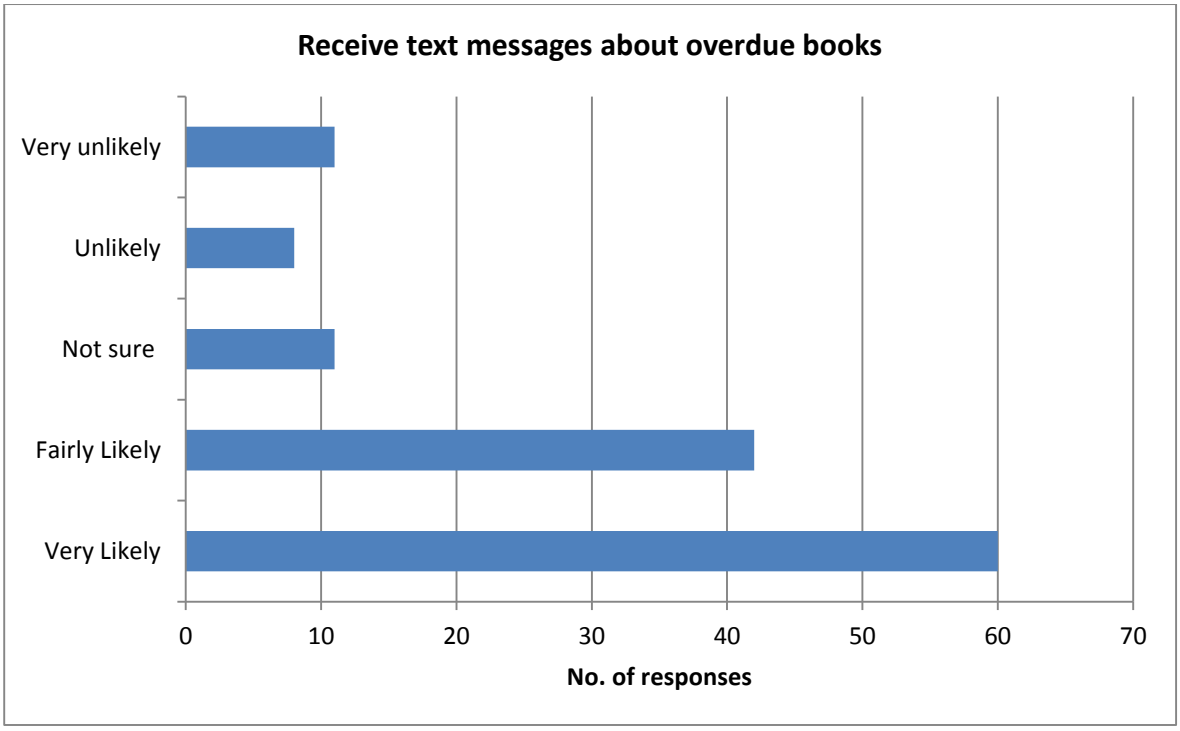

Figure 4.21: Responses to category 'receive text messages about overdue books'

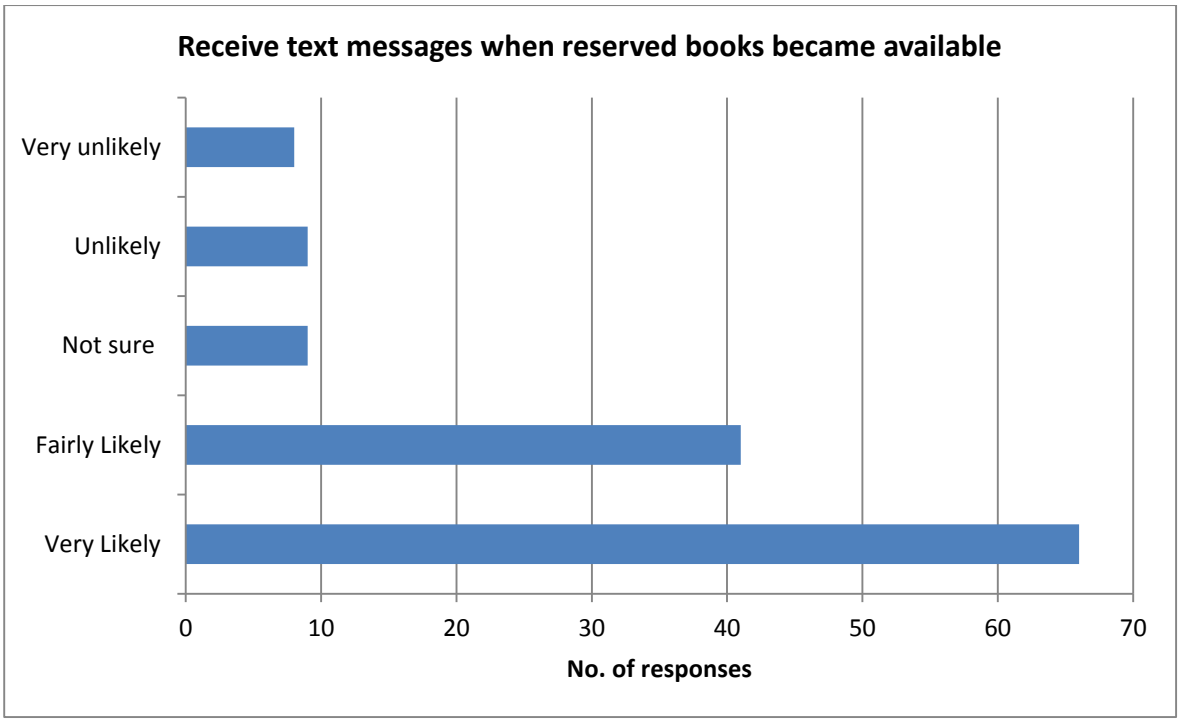

Figure 4.22: Responses to category 'receive text messages when reserved books became available'

Figure 4.23 illustrates the responses to the category 'receive text messages when reserved books became available'. This was the most popular of the potential services with a total of 80.5% of participants answering that they would be 'very likely' or 'fairly likely' to use this service.

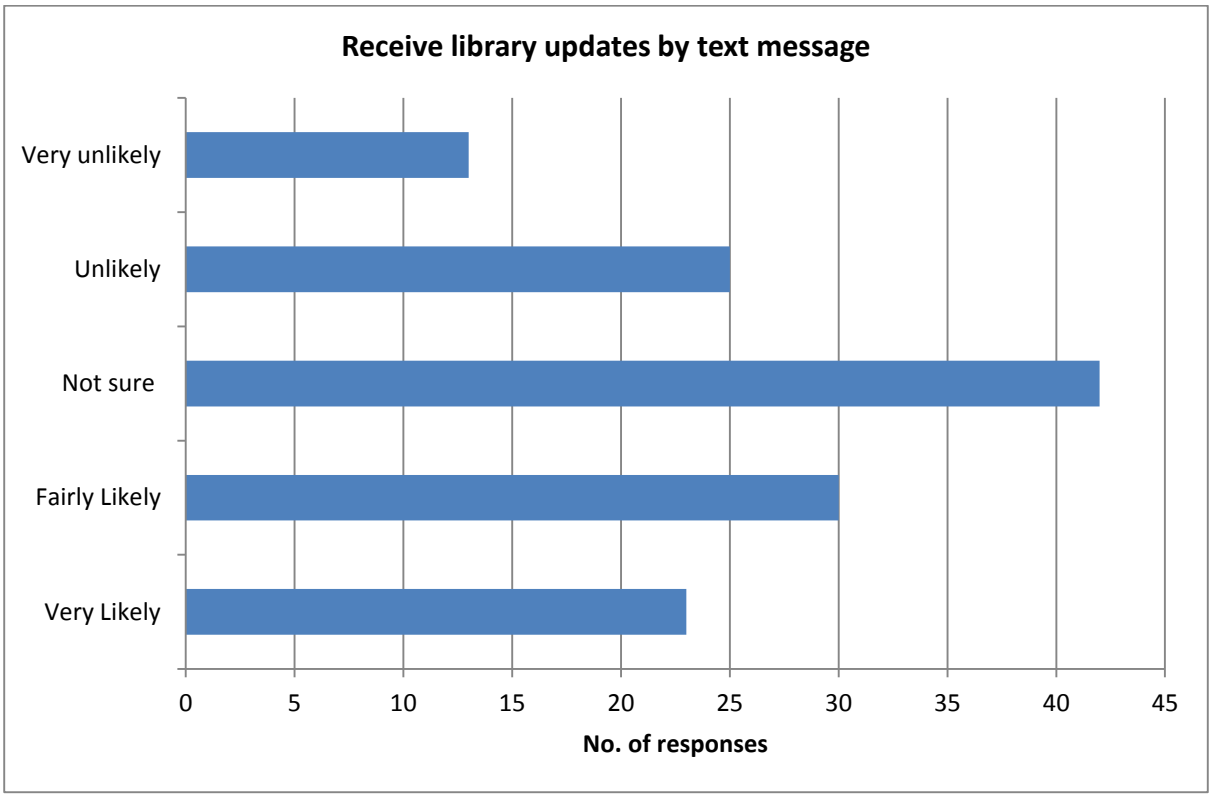

Figure 4.23: Responses to category 'receive library updates by text message'

As can be seen in Figure 4.22, the potential service 'receive library updates by text message' produced a mixed response. The highest answer was in the 'not sure' category, which was selected by 31.6% of participants. 39.9% of respondents stated they would be likely to use the service, with 22.6% selecting 'fairly likely' and 17.3% ticking 'very likely'.

4.3.4.2 Further suggestions for implementing mobile library services

The final question invited respondents to make suggestions as to how the LRC could develop mobile-friendly services. It received 31 replies (23.3%). Table 4.3 summarises the main themes.

Do you have any further suggestions as to how the LRC could develop mobile-friendly services?	No. of responses	%
Create social media accounts, such as Facebook and Twitter	6	12.9
Increase e-book provision	6	19.3
Lend mobile equipment and chargers	4	12.9
Create an app/mobile website	4	12.9
More lenient phone use policy	2	6.4
More effective promotion of WiFi network	2	6.4
Mobile printing	1	3.2
Effective use of text alerts	1	3.2

Table 4.3: Summary of further suggestions regarding mobile library services

12.9% of those who answered this question felt that the LRC should have a social media presence. It was suggested that using social networks are an effective way to communicate with students:

> 'Get a twitter and facebook account as lots of students are on it' (Respondent 49)

> 'I don't go on the library website much but if their was a facebook page I'd check that more' (Respondent 73)

The usefulness of social media for sending LRC updates was also commented upon:

> ‘Put updates such as unexpected closures on Twitter as it’s instant.’ (Respondent 3)

> ‘Updates about new book releasing on social networking sites such as Twitter’ (Respondent 19)

Several respondents highlighted the need for a good supporting infrastructure when delivering mobile library services. This ranges from lending out tablets and chargers, to ensuring that awareness is raised of the availability of the WiFi network:

> ‘Wifi could be made easily accessible. Maybe login with student Ids. Check maybe service cloud, they do a similar thing.’ (Respondent 41)

> ‘You should advertise that wifi is available for students as I didn’t know it was.’ (Respondent 74)

> ‘Could have re-charge zones in the library for mobile devices that get used in class during the day’ (Respondent 108)

Furthermore, the need for a more lenient mobile phone policy was emphasised:

> ‘Don’t tell us off for using phones in the library’ (Respondent 6)

12.9% of respondents suggested that the LRC should create apps, including e-book apps and apps that support their college work:

> ‘Student support app with studying tips and help’ (Respondent 21)

> ‘A library app with instant messaging so you can renew books etc.’ (Respondent 56)

> ‘I think an app or mobile friendly website that allows you to view your account is very useful. If you could maybe scan barcodes of book that you might be interested in later to create a reading list – that could be useful.’ (Respondent 117)

One respondent expressed frustration at not always being able to get the electronic resources that she/he requires, and felt that libraries were falling behind in this respect:

> ‘Sadly libraries seem to be now unable to keep up. I need to access journals/ebooks and they are often not available’ (Respondent 13)

However, the responses also demonstrate a lack of awareness of electronic resources that are currently available. One suggestion related to acquiring core text books electronically, but these are already part of the collection. Another participant suggests the LRC acquire an app for e-books, which already exists for both of the LRC’s e-book platforms:

> ‘Get the business BTEC texts as ebooks’ (Respondent 11)

> ‘Create an app for library ebooks’ (Respondent 131)

Overall, the replies suggest that creating mobile library services would be viewed in a positive light. However, one respondent warns that if the LRC was to send updates by text, they should be relevant and not sent too frequently:

‘If you do send updates by text or email they should be important and not too often as some places just spam you’ (Respondent 30).

4.4 Conclusion

The aim of this chapter was to present the findings gathered from the questionnaire. Mobile device ownership was found to be high with an average of 3.5 devices owned per respondent. Smartphones were the most popular devices, and along with tablets, proved to be the most versatile in terms of the range of activities performed. Mobile devices convenience and accessibility in supporting everyday activities was underlined. Mobile apps were popular and were also used for a wide variety of tasks.

Just over 60% of respondents had a limited mobile internet allowance, and for some this meant restricting certain activities. Access to WiFi emerged as an important means of staying within their allowance, but a significant proportion or participants did not know how to access the wireless network. Knowledge of QR codes was also found to be low suggesting that awareness of them would need to be raised if they were to be used successfully.

Overall, the findings indicated that there is a demand for mobile library services at Shipley College. Some features of a potential mobile website proved to be more popular than others. A clear majority would like to be able to check library opening times, whereas there was more uncertainty regarding the option to check library accounts. Contacting librarians via instant messaging was considered to be more favourable than by text message, although a high proportion of respondents would like to receive text messages when reserved books became available. Using social networks was an extremely popular activity, and it was suggested that the LRC should have a presence on social networks in order to connect with students. Other suggestions related to increasing e-book provision. However, some of the responses suggested that there is a lack of awareness of current e-book stock, and furthermore, a significant proportion of respondents did not know how to view or download an e-book on their devices. This suggests that in addition to implementing new mobile-

friendly services, more needs to be done to raise awareness of existing services. The results will be further analysed in the next chapter and discussed in relation to the existing literature.

Chapter 5: Discussion

5.1 Introduction

The previous chapter presented the findings from the research project; the aim of this chapter is to discuss the findings within the context of existing research. On the whole, the findings were relatively consistent with earlier research, although some trends seem to be specific to Shipley College, for example, ownership of certain mobile devices appears to be higher than has been reported in other research. The specific information needs of mobile device users have been confirmed as well as certain barriers to implementing mobile services. These matters will be explored more fully in this chapter.

5.2 Mobile device ownership and use

In line with objectives one and two, the study investigated what mobile devices were owned and how they were being used. Mobile device ownership was found to be high with an average of 3.5 devices owned per respondent. Ofcom (2013) found that on average there are at least three internet-enabled devices per household in the UK, so the findings of this research are similar. Ofcom also reported that 51% of people in the UK have smartphones, although this figure increased to 77% 16 – 24 age group. This research found smartphone ownership to be significantly higher with 91.7% of respondents stating that they own a smartphone. Ownership of tablets was also considerably higher with 53.3% of participants stating that they owned tablets compared to an average of 24% reported by Ofcom.

Similar to the trends reported in Ofcom's (2013) report, a diverse range of tasks were being carried out with mobile devices on a frequent basis. In contrast to Ofcom's research,

smartphones were used more frequently than laptops for internet access. However, Ofcom also states that those in the 16 – 24 age bracket are most likely to access the internet across a range of devices. Due to the research being conducted in an FE college, a large proportion of participants would have fallen within the 16 – 24 age group. The research therefore confirms Ofcom's finding that this is a versatile group when it comes to accessing the internet. The popularity of smartphones correlates with findings at Sheffield University ("Student mobile device survey 2011", 2011) where students were more likely to use smartphones in lectures than any other device.

As in research findings at Hunter College (Becker at al., 2013) and Sheffield University ("Student mobile device survey 2011", 2011), it was discovered that students at Shipley College were using mobile devices for educational purposes with research for coursework being carried out on every device asked about. Crucially, what the trends discussed above highlight is that students at Shipley College are technologically well-equipped and are using an array of mobile devices to carry out varied tasks, including research for coursework. This underlines the need for the LRC to provide services which enable and support library patrons to use their mobile devices at college.

5.3 Mobile information needs

The results confirmed research discussed in the literature review: that users of mobile technology are likely to be looking for information whilst on the move (Walsh, 2012) and finding information often needs to be fast and convenient (Bomhold, 2013). As Walsh (2012) points out, searching for information is often context-specific and the research verifies this. Participants mentioned quickly looking up information and performing tasks such as finding bus times. Johnson et al. (2012) stated that with mobile users there is an expectation to be

able to access resources anywhere, and this was also evidenced in the findings. Respondents commented that mobile devices allowed them to "access the internet when away from a computer" (Respondent 4) and "Access my music, photos and games anywhere" (Respondent 103). Convenience and accessibility has been discussed as one the benefits of mobile devices (Lippincott, 2010; Walsh, 2012). This view is validated in the research. Respondents talked about "quick internet access" (Respondent 67), and being able to "browse the net fast for answers" (Respondent 21). This may account for why smartphones are used more frequently than devices such as laptops as they are so highly portable and accessible. The findings discussed above are important because they highlight how users' expectations differ in the mobile era (Booth, 2013; Bomhold, 2013) and that if libraries ignore these trends they risk becoming less relevant, and, consequently, losing customers (Johnson, Adams and Cummins, 2012; Lippincott, 2010; Little, 2011, L. Thomas, 2012). A gap was identified in the literature review in that most of the published literature concerned HE. The findings of this study have shown that the needs and expectations of FE students for mobile services are much the same as those in HE.

5.4 Mobile library services

The fourth objective in this study was to gauge students' opinion of proposed mobile library services at Shipley College.

5.4.1 Services delivered via SMS

Ofcom (2013) has reported that the numbers of SMS being sent are in decline. However, the respondents appeared to be avid users of SMS with 67.2% of smartphone users texting several times a day. The research produced mixed findings regarding delivering library

services via SMS. Participants showed willingness to use their devices for some services but not others. 59.4% of respondents were either unlikely or unsure to ask a librarian for help via text message. These findings contradict research by Ruppel and Vecchione (2012), which cites SMS reference as a popular option, but supports findings by Walsh (2012) where respondents also expressed uncertainty regarding SMS reference. Receiving SMS about overdue books and when reserved books became available were much more popular options with a clear majority saying they would use this service. However, receiving library updates by SMS produced a mixed response with a significant proportion saying they would be unlikely or uncertain to use this service. Walsh's (2012) research found that SMS services were likely to be better received if they were perceived to be useful, and this may explain the mixed responses regarding SMS services. Similar findings by Luo suggested they were useful for "brief and straightforward information needs" (2013 p.132). Receiving SMS when reserved books became available serves a need whereas receiving library news and updates may be considered to be superfluous. This is alluded to by one of the participants who maintained that if the LRC does send updates by text they should be important and "not too often as some places just spam you" (Respondent 30). It is vital, therefore, that if the LRC does decide to communicate with students via SMS that the service meets an actual need and is not used indiscriminately to promote services.

5.4.2 Instant messaging

The option of contacting library staff via instant messaging appeared to be more favourable to participants than by SMS. Instant messaging seemed to be popular with the respondents, validating Ofcom's claims that web-based communication is the most popular form of communication with those in the 16-24 age category (2013, p. 6). Almost two-thirds of respondents stated that they would contact a librarian via instant messaging in contrast to

approximately 40% for SMS reference. Furthermore, a number of respondents listed instant messaging when discussing the most important tasks that their devices allowed them to do. Instant messaging has been proven to be an effective means of communication at a number of educational establishments, including University of Sussex (Barnes, 2011) and Middlesex University (Curtis-Brown, 2011). The findings validate research by Ruppel and Vecchione (2012) where instant messaging was found to be a popular option. The expectation amongst mobile device users for fast and convenient information has already been emphasised, and instant messaging can address this need. Haerkoenen et al. (2012) stated that the majority of chat queries could be answered with their chat reference service at Cardiff University Library. It would appear, therefore, that implementing chat reference at Shipley College may be a viable service.

5.4.3 QR codes

Knowledge of QR codes was found to be very low with nearly two-thirds of respondents stating that that they did not know what a QR code was. This confirms Elmore's and Stephens' (2012) view that one of the biggest barriers to using QR codes successfully is lack of knowledge of what they are. QR codes can be used effectively, as has been shown by Semenza et al. (2012) and Ford (2013), but as Lamb and Johnson (2013) point out, marketing and user education must be the first steps in using them. Moreover, according to Walsh (2012) and Ford (2013) there is little point in their use unless they link to mobile-friendly content. Therefore, if QR codes are used in the LRC, a holistic approach would need to be adopted which consisted of education and marketing, as well as ensuring that the content they link to is suitable and meets a need. Nearly three-quarters of participants have expressed a desire to access e-books or online articles, and as research has shown (Semenza et al., 2012; Ford, 2013; Green, 2013), QR codes may be an effective way of linking to electronic content.

5.4.4 Potential mobile website

Overall, respondents showed a desire for a mobile website, echoing calls for more mobile-friendly content at the University of Huddersfield (Walsh, 2012) and at the University of Kent ("Information Services mobile device survey 2012", 2012). Responses were favourable towards the majority of listed categories; in particular, respondents would like to find library opening hours/contact details and read online books or articles. The category 'check your library account' prompted the highest number of 'not sure' responses at 27.1%. Until recently, the majority of LRC users would have carried out activities such as renewing and reserving books directly at the enquiry or issue desk. The LRC has recently created new content on the student intranet, including a guide on managing your library account, and has been encouraging students to be more self-sufficient in this respect. However, this has been a recent endeavour, so it is possible that some students are unsure what is meant by the term 'check your library account'. On the whole, it is apparent that there is a need for mobile-friendly webpages at Shipley College, particularly Walsh (2012) argues, as this is often a precursor to other mobile services.

5.4.5 Mobile apps

The findings revealed that mobile apps were extremely popular with the participants. A wide variety of apps were used by participants, and their usefulness in managing tasks was discussed. However, a couple of respondents also commented on the transient nature of apps, stating that they regularly delete them. This lends credence to Wilson's (2013) claim that it can be difficult to keep apps' target audience using them after the initial marketing campaign. If an app was to be created, Wilson's warning highlights the need to ensure that the content is relevant and up-to-date or it is likely to be deleted.

5.5 Barriers to implementing mobile library services

The third research objective was to investigate barriers to implementing mobile library services, and the findings produced some interesting facts in this respect. Problems with implementing mobile services due to lack of knowledge has already been shown in relation to QR codes, and the results show that this is a concern in other areas as well. Participants expressed a clear desire to be able to access electronic resources on their mobile devices. Requests for more e-books featured prominently in responses to the 'further suggestions' question. However, participants also demonstrated lack of awareness of current e-book stock as well as how to access e-books on their mobile devices, which underlines the need for more effective promotion of existing services (Luo, 2012).

The cost of accessing mobile internet was also found to be an issue for a significant number of respondents. This contradicted findings by Paterson and Low (2011) where the majority of those surveyed stated that their allowance was sufficient for their needs. Access to a WiFi connection has been shown to be important to students ("Information Services mobile device survey 2012", 2012), but, worryingly, a large proportion of respondents at Shipley College were unaware how to connect to the wireless network. These findings validate Walsh's (2012) and Lamb and Johnson's (2013) view of the importance of marketing to ensure that services are used.

As was discussed in the literature review, implementing mobile library services can be a costly exercise and utilising mobile-friendly social networking sites, such as Facebook, may offer a cost-effective solution (Parsons, 2013). The findings support this view as use of social networks was found to be extremely high. Moreover, a number of participants stated that they would like the LRC to have a presence on social networking sites lending credence to Lawson's (2014) findings that social networks can help libraries to reach a new audience.

5.6 Conclusion

Overall, the findings have been consistent with earlier research. An overview has been gained of device ownership and use, and the results have shown that the participants are technologically well-equipped and are versatile when it comes to accessing the internet. Smartphone and tablets, in particular, have emerged as flexible devices for carrying out a range of tasks on a daily basis. The information needs and expectations of mobile device users have been confirmed and the implications of this for libraries have been discussed. Meeting the fifth research objective, a picture has emerged of which services would be most feasible to introduce. Instant messaging would appear to be popular, but only certain aspects of an SMS service are desired. A need for mobile-friendly web content has been demonstrated and either a mobile website or app may be a viable option. However, in accordance with earlier research, implementing any service is likely to meet with barriers unless it serves an actual need and its introduction is preceded by marketing and user education. The final chapter will review the study's research questions and objectives as well as reflecting on the key sections. Recommendations will be made on the basis of the research findings.

Chapter 6: Conclusion

6.1 Introduction

In response to the proliferation of mobile technology, this study set out to investigate demand for mobile library services at Shipley College. Much of the published literature was concerned with HE, so this study sought to investigate the needs of those in a specific FE setting. Following on from this, a further research aim was to ascertain what type of mobile services should be considered. This chapter reviews the research aims and objectives and the extent to which they have been met. They key sections in this study are reflected upon and recommendations are made based on the findings. Finally, suggestions are made for future research.

6.2 Research aims and objectives

In order to establish demand for mobile library services at Shipley College, a number of research objectives were established. The first objective was to gain knowledge of the range of devices owned. Gaining insight in to how mobile devices were being used was the second objective. Both objectives were considered to be important first steps in the research as knowledge of current device ownership and use should influence the development of any new services. These two objectives have been met, and the participants were found to be technologically well-equipped and using mobile devices to perform a diverse range of tasks, including college work. The third objective investigated possible barriers to implementing mobile library services. Meeting the third objective has provided valuable insight in to

potential obstacles when implementing new services and has underlined the importance of user education and marketing. The fourth objective was to gauge the participants' opinion on using their devices for library services, and the research has been successful in establishing that there is a definite need for the LRC to provide mobile-friendly services. Following on from this, the fifth objective helped determine which services are likely to be viable. Services delivered via instant messaging and social media appear to be popular, but only certain features of an SMS service are desired. Respondents have made it clear which aspects of a mobile website they would be likely to use, so creation of mobile content would need to be based on these expectations.

6.3 Review of the research

The study employed a predominantly quantitative approach in order to investigate the research questions. Questionnaires were chosen as the survey instrument on the basis of similar studies and also due to the breadth of responses required. Closed questions were used for fact finding and to chart trends in mobile device ownership and use. Open-ended questions provided useful qualitative data, which allowed certain issues to be explored in greater depth. Due to the fact that a non-random sampling method was used, the study has low external validity. However, purposive sampling was considered to be the most appropriate method for this study as it ensured that those being sampled were relevant to the research question.

Prior to conducting the primary research, a literature review was conducted which provided context for the study. The literature review revealed a number of important issues, which were subsequently investigated in the research. Users of mobile technology have been found to have specific information needs, which were corroborated in the results. It was an

important finding because understanding users' needs and expectations will be key to providing effective mobile services. A variety of mobile library services were discussed in the literature review, and this formed the basis for the services which were explored in the research. As discussed in the literature review, the results showed that lack of awareness of services and the cost of accessing the mobile web could be potential barriers to implementing mobile services. However, the literature review also revealed that mobile technology presents libraries with opportunities to engage with their users in innovative ways, and effective marketing and user education can help to ensure that new services will be successful.

Using a quantitative research approach has enabled a broad overview of mobile device ownership and use at Shipley College to be obtained. However, one of the limitations of using questionnaires as the primary research tool was that the researcher was unable to follow up areas of interest, e.g. the preference for some services over others. Nonetheless, in answer to the research questions, the results have provided important insight in to students' needs and expectations for mobile services at Shipley College as well as providing an indication of the most feasible services to implement. In the next section, a number of recommendations are made based on the outcomes of the study.

6.4 Recommendations

- On the basis of current mobile device use at Shipley College, as well as the interest shown by participants in potential services, it is recommended that mobile-friendly services are provided by the LRC. Instant messaging would appear to be a viable service to implement, based on user feedback. SMS services should also be considered, but only those specific aspects of it which users showed a preference for.

The service must meet a need, and it should be easy for students to opt out if they wish.

- The LRC should also consider creating a social networking profile. This appeared to be an extremely popular option with participants, and it has been shown to be an effective way to engage users. However, protocols would need to be in place outlining how the service would be staffed and also how issues such as abuse would be dealt with.
- It is recommended that the LRC creates mobile-friendly web content. Access should be provided to the information that users specified a preference for in the findings, e.g. finding opening hours and being able to search the library catalogue. If cost is a factor in creating this content, social networking sites, such as Facebook, may offer an alternative to providing access to this information.
- It is vital that any new services are marketed effectively and are accompanied by user education. Moreover, marketing of existing services, such as e-book provision, has been shown to be inadequate, so this would also need to be addressed. QR codes may offer potential to promote the LRC's resources, but they are likely to be unused unless students are first made aware of their purpose.
- If mobile services are introduced, there will need to be an infrastructure in place to support them. Students will need to be made aware of how to access WiFi, and the LRC should also consider providing charging facilities for mobile devices. Policies which restrict the use of mobile phones in the LRC should be revised.

6.5 Suggestions for further research

As has been previously mentioned, using a quantitative approach enabled the researcher to attain a broad indication of mobile device ownership and use at Shipley College as well as helping to predict demand for proposed services. However, some interesting trends emerged which couldn't be explored in great depth using a quantitative approach, and these may warrant further investigation. In particular, attitudes towards SMS services were ambivalent, so it may be interesting to explore the reasons behind this. A significant proportion of participants expressed uncertainty about checking their library account on a mobile site, and a follow-up study would be able to explore the motives behind these responses.

Audio services were omitted from the consideration of mobile library services in this study, but due to the large number of respondents who own MP3 players, it may be worth exploring whether there is a demand for audio content, such as creating library guides in MP3 format. All of the technologies discussed are likely to evolve or be superseded in the future, so in terms of follow-up research, there will always be scope to investigate demand for new services or whether current services are still relevant. Moreover, if the services recommended in the section above are implemented, a review will be necessary in the future to ascertain how effective and well used they are.

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Appendix A: Consent from college principal to carry out research

Emer O'Connor <eoconnor@shipley.ac.uk>

Request for consent to survey students

Emer O'Connor <eoconnor@shipley.ac.uk> 23 May 2014 15:17
To: Nav Chohan <nchohan@shipley.ac.uk>

Dear Nav,

I work part-time in the Learning Resource Centre, and am currently completing my MSc in Information and Library Studies. For my dissertation, I am researching whether there is demand for the LRC to provide services for mobile devices. This includes mobile optimised content, an instant messaging enquiry service and the use of Quick Response (QR) codes. The purpose of the research would be to investigate how students currently use their phones (e.g whether they are purely for recreational purposes) and their feelings about using them to receive library services.

May I have your permission to survey a sample of the students in respect of the above?

Many thanks,

--
Emer O'Connor

Learning Resource Centre
01274 327226

Emer O'Connor <eoconnor@shipley.ac.uk>

Request for consent to survey students

Nav Chohan <nchohan@shipley.ac.uk> 23 May 2014 15:23
To: Emer O'Connor <eoconnor@shipley.ac.uk>

Absolutely fine but please pass the questionnaire/survey past Julie W first.

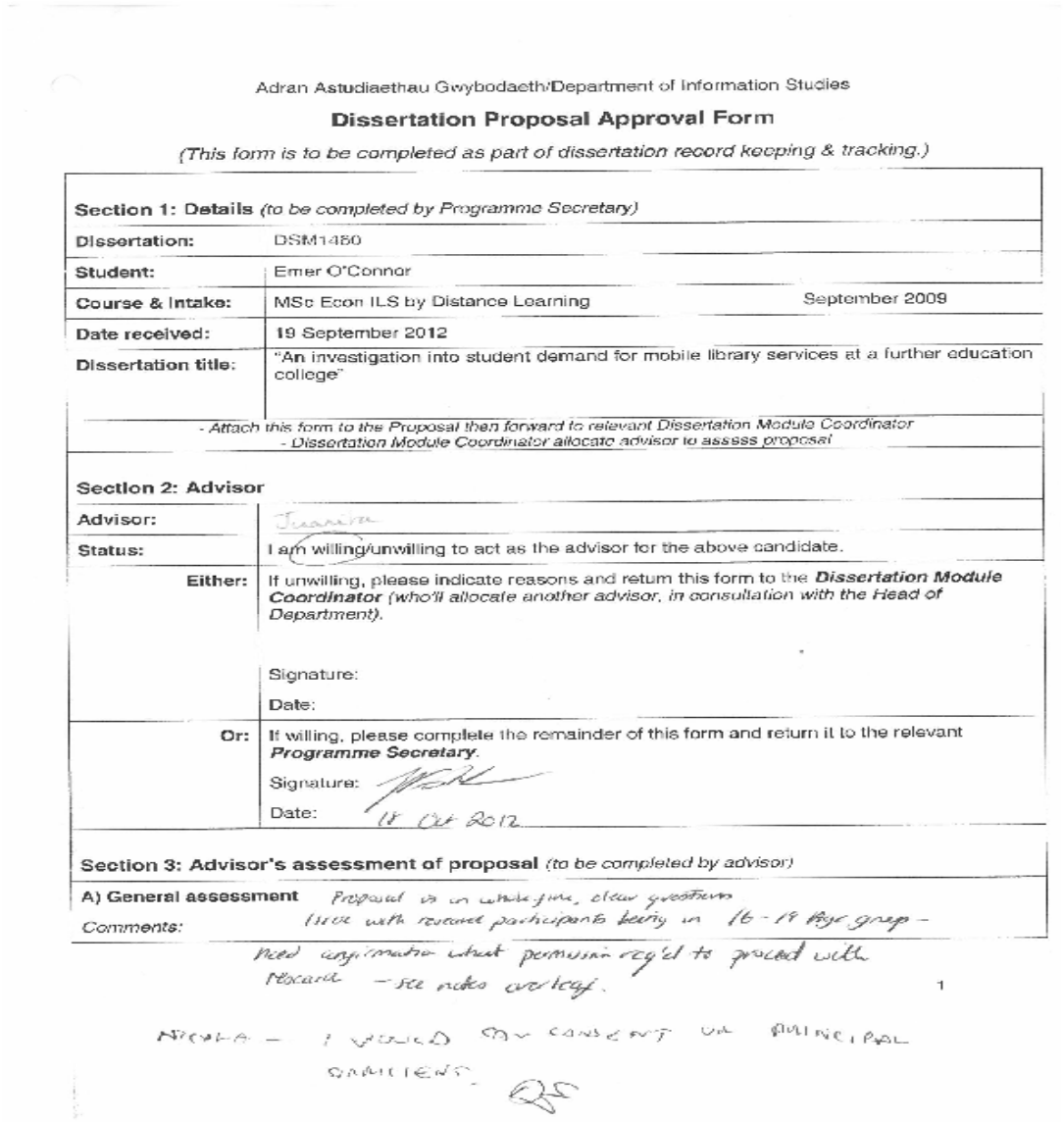
Take care, Nav

[Quoted text hidden]

> [Quoted text hidden]

THINK BEFORE YOU PRINT.....do you really need to ? ****** This email and its attachments may be confidential and are intended solely for the use of the individual to whom it is addressed. Any views or opinions expressed are solely those of the author and do not necessarily represent those of Shipley College. If you are not the intended recipient of this email and its attachments, you must take no action based upon them, nor must you copy or show them to anyone. Please contact the sender if you believe you have received this email in error.

Appendix B: Ethical approval from the Department of Information Studies



Adran Astudiaethau Gwybodaeth/Department of Information Studies

Dissertation Proposal Approval Form

(This form is to be completed as part of dissertation record keeping & tracking.)

Section 1: Details *(to be completed by Programme Secretary)*	
Dissertation:	DSM1480
Student:	Emer O'Connor
Course & Intake:	MSc Econ ILS by Distance Learning September 2009
Date received:	19 September 2012
Dissertation title:	"An investigation into student demand for mobile library services at a further education college"

- Attach this form to the Proposal then forward to relevant Dissertation Module Coordinator
- Dissertation Module Coordinator allocate advisor to assess proposal

Section 2: Advisor	
Advisor:	Joanna
Status:	I am willing/unwilling to act as the advisor for the above candidate.
Either:	If unwilling, please indicate reasons and return this form to the ***Dissertation Module Coordinator*** *(who'll allocate another advisor, in consultation with the Head of Department).*
	Signature:
	Date:
Or:	If willing, please complete the remainder of this form and return it to the relevant ***Programme Secretary***.
	Signature:
	Date: 18 Oct 2012

Section 3: Advisor's assessment of proposal *(to be completed by advisor)*

A) General assessment

Comments: Proposal is on whole fine, clear questions
Issue with research participants being in 16-19 Age group -
Need confirmation what permission req'd to proceed with
Research - see notes overleaf.

NICOLA - I WOULD SEE CONSENT OF PRINCIPAL
SIGNED.

Appendix C: Information letter which accompanied the questionnaire

Information letter: Investigating the demand for mobile library services at Shipley College

Thank you for taking part in this research study. Please read this page. It contains important information about the nature of the research and your rights as a participant.

Who is the researcher?

Emer O'Connor (Learning Resources Assistant at Shipley College)

What is the research for?

This research is for a MSc. in Information and Library Studies from Aberystwyth University.

What is the purpose of the study?

The purpose of the research is to investigate whether there is a demand for mobile library services at Shipley College. The aims are to gather information about what mobile devices are currently owned, and to explore whether there is interest in using these devices to receive library services, such as text alerts and instant messaging. As the research will be used to shape future services, the results of the study will be shared with the LRC manager.

Anonymity

This questionnaire is anonymous and all replies will be held securely and confidentially.

Your involvement in the study

The questionnaire should take 5 – 10 minutes to complete. Participation is voluntary. You may decide to withdraw your consent at any time and without giving reason.

Contact

If you want to discuss the study, or have a query regarding any of the questions, please contact me at the following email address: eoconnor@shipley.ac.uk

Appendix D: The Questionnaire

1. Do you own the following devices? Please tick all that apply.

	Yes	No	No, but plan to in the next two years
Smartphone (a phone that can access the internet, email and apps, e.g iPhone and Blackberry)	☐	☐	☐
Non web-enabled mobile phone	☐	☐	☐
Laptop	☐	☐	☐
Netbook	☐	☐	☐
MP3 player (e.g iPod)	☐	☐	☐
E-book reader (e.g. Kindle, Kobo)	☐	☐	☐
Tablet computer (e.g. ipad)	☐	☐	☐

2. How much internet allowance does your mobile contract include?

   I have unlimited mobile internet allowance ☐

   I have limited mobile internet allowance ☐

   I have no mobile internet allowance ☐

3. If you have limited mobile internet allowance, how does this affect the services you access on your mobile device?

4. If applicable, how often do you use your smartphone to do the following? Please tick all that apply.

	Several times a day	Once a day	Several times a week	Less than once a week	Several times a month	Less than once a month	Never
Text message	☐	☐	☐	☐	☐	☐	☐
Send an email	☐	☐	☐	☐	☐	☐	☐
Browse the internet	☐	☐	☐	☐	☐	☐	☐
Use social networks, e.g. Facebook and Twitter	☐	☐	☐	☐	☐	☐	☐
Download apps	☐	☐	☐	☐	☐	☐	☐
Watch videos	☐	☐	☐	☐	☐	☐	☐
Download music	☐	☐	☐	☐	☐	☐	☐
Do research for coursework	☐	☐	☐	☐	☐	☐	☐
Read e-books	☐	☐	☐	☐	☐	☐	☐

5. If applicable, how often do you use your laptop to do the following? Please tick all that apply.

	Several times a day	Once a day	Several times a week	Less than once a week	Several times a month	Less than once a month	Never
Text message	☐	☐	☐	☐	☐	☐	☐
Send an email	☐	☐	☐	☐	☐	☐	☐
Browse the internet	☐	☐	☐	☐	☐	☐	☐
Use social networks, e.g. Facebook and Twitter	☐	☐	☐	☐	☐	☐	☐
Download apps	☐	☐	☐	☐	☐	☐	☐
Watch videos	☐	☐	☐	☐	☐	☐	☐
Download music	☐	☐	☐	☐	☐	☐	☐
Do research for coursework	☐	☐	☐	☐	☐	☐	☐
Read e-books	☐	☐	☐	☐	☐	☐	☐

6. If applicable, how often do you use your netbook to do the following? Please tick all that apply

	Several times a day	Once a day	Several times a week	Less than once a week	Several times a month	Less than once a month	Never
Text message	☐	☐	☐	☐	☐	☐	☐
Send an email	☐	☐	☐	☐	☐	☐	☐
Browse the internet	☐	☐	☐	☐	☐	☐	☐
Use social networks, e.g. Facebook and Twitter	☐	☐	☐	☐	☐	☐	☐
Download apps	☐	☐	☐	☐	☐	☐	☐
Watch videos	☐	☐	☐	☐	☐	☐	☐
Download music	☐	☐	☐	☐	☐	☐	☐
Do research for coursework	☐	☐	☐	☐	☐	☐	☐
Read e-books	☐	☐	☐	☐	☐	☐	☐

7. If applicable, how often do you use your e-book reader to do the following? Please tick all that apply.

	Several times a day	Once a day	Several times a week	Less than once a week	Several times a month	Less than once a month	Never
Text message	☐	☐	☐	☐	☐	☐	☐
Send an email	☐	☐	☐	☐	☐	☐	☐
Browse the internet	☐	☐	☐	☐	☐	☐	☐
Use social networks, e.g. Facebook and Twitter	☐	☐	☐	☐	☐	☐	☐
Download apps	☐	☐	☐	☐	☐	☐	☐
Watch videos	☐	☐	☐	☐	☐	☐	☐
Download music	☐	☐	☐	☐	☐	☐	☐
Do research for coursework	☐	☐	☐	☐	☐	☐	☐
Read e-books	☐	☐	☐	☐	☐	☐	☐

8. If applicable, how often do you use your tablet computer to do the following? Please tick all that apply.

	Several times a day	Once a day	Several times a week	Less than once a week	Several times a month	Less than once a month	Never
Text message	☐	☐	☐	☐	☐	☐	☐
Send an email	☐	☐	☐	☐	☐	☐	☐
Browse the internet	☐	☐	☐	☐	☐	☐	☐
Use social networks, e.g. Facebook and Twitter	☐	☐	☐	☐	☐	☐	☐
Download apps	☐	☐	☐	☐	☐	☐	☐
Watch videos	☐	☐	☐	☐	☐	☐	☐
Download music	☐	☐	☐	☐	☐	☐	☐
Do research for coursework	☐	☐	☐	☐	☐	☐	☐
Read e-books	☐	☐	☐	☐	☐	☐	☐

9. What is the most important thing(s) that your mobile device allows you to do?

10. If applicable, what type of mobile apps do you use?

News apps	☐
Weather apps	☐
Educational apps	☐
Games apps	☐
Travel apps (e.g. Google Maps)	☐
Search tool apps	☐
Social networking apps	☐
Sports apps	☐
Music	☐

Other (please specify) _____

11. Do you have any further comments regarding mobile apps?

12. If the LRC created a mobile-friendly website, how likely would you be to do the following?

	Very likely	Fairly likely	Not sure	Unlikely	Very unlikely
Check your library account	☐	☐	☐	☐	☐
Renew library books	☐	☐	☐	☐	☐
Reserve library books	☐	☐	☐	☐	☐
Search the library catalogue	☐	☐	☐	☐	☐
Read online articles or books	☐	☐	☐	☐	☐
Find library opening hours or contact details	☐	☐	☐	☐	☐

13. If the following library services were introduced, how likely would you be to use them?

	Very likely	Fairly likely	Not sure	Unlikely	Very unlikely
Ask a librarian for hep or advice via text message	☐	☐	☐	☐	☐
Ask a librarian for help or advice via chat/instant messaging	☐	☐	☐	☐	☐
Receive text messages about overdue books	☐	☐	☐	☐	☐
Receive text messages when reserved books became available	☐	☐	☐	☐	☐
Receive library news and updates by text message	☐	☐	☐	☐	☐

14. Have you ever viewed or downloaded one of the LRC's e-books on a mobile device?

Yes ☐

No ☐

No, I don't know how ☐

15. When on campus, do you connect to the Wi-Fi network with your mobile device?

Yes ☐

No ☐

16. If you do not connect to the wireless network with your mobile device, please give your reason(s)

17. Do you know what a QR code is?

Yes ☐

No ☐ (If no, continue to question 19)

18. Have you ever scanned a QR code with your mobile device?

Yes ☐

No ☐

19. Do you have any further comments regarding QR codes?

20. Do you have any further suggestions as to how the LRC could develop mobile-friendly services?

Appendix E: Email from Issues Online outlining proposed changes to their website

Emer O'Connor <eoconnor@shipley.ac.uk>

Mobile Site

issues@independence.co.uk <issues@independence.co.uk> 7 October 2014 14:33
To: Emer O'Connor <eoconnor@shipley.ac.uk>

Dear Emer

Thank you for your enquiry.

Issues Online is not currently mobile friendly, but we are currently in the process of having a new website designed, which should be scale-able and far more mobile friendly. We are hoping to launch the new website around Christmas-time.

Best regards,

Jan Sunderland

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The Studio, High Green, Great Shelford
Cambridge CB22 5EG
England
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Fax: + 44 (0)1223 550806
E-mail: issues@independence.co.uk
URL: www.independence.co.uk

From:	"Emer O'Connor" <eoconnor@shipley.ac.uk>
To:	issues@independence.co.uk
Date:	07/10/2014 14:09
Subject:	Mobile Site

[Quoted text hidden]